NATIONAL PUBLICATION FOR BUYING-USING-SELLING COMPUTER HARDWARE & SOFTWARE

VOL. 5 NO. 7
JULY 1985
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DG/One MSDOS "Take-Me-Along"

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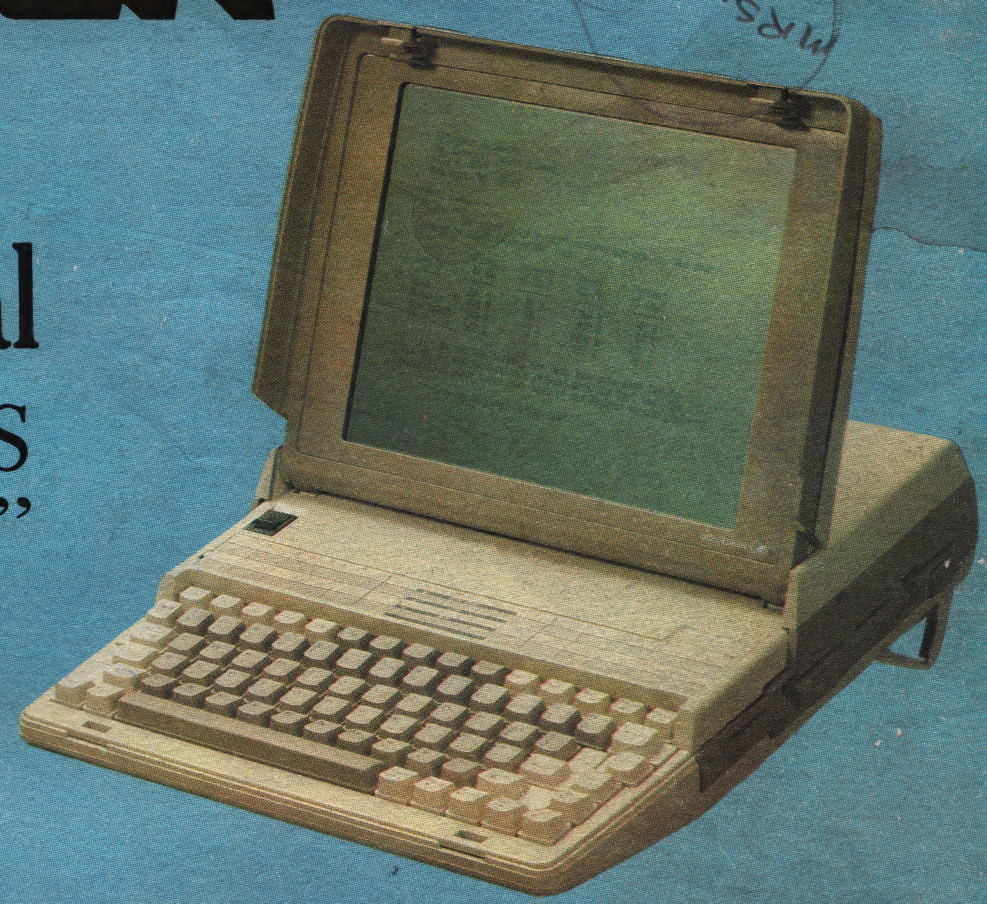

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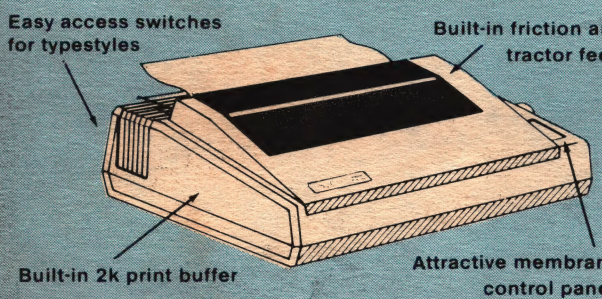

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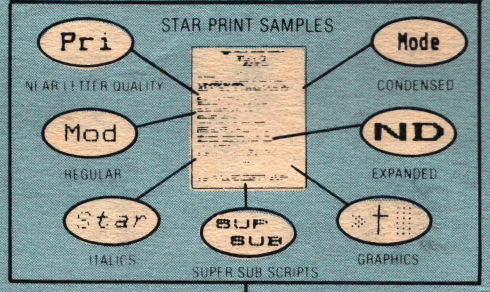

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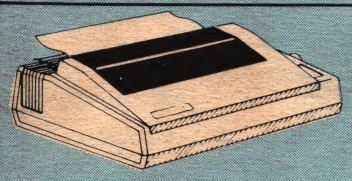

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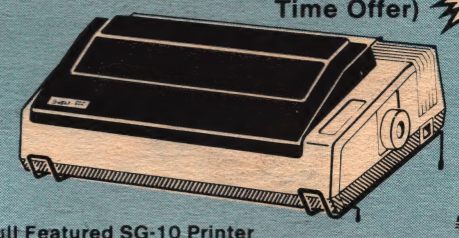
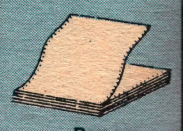


Full Featured SG-10 Printer



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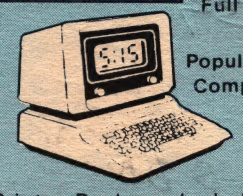

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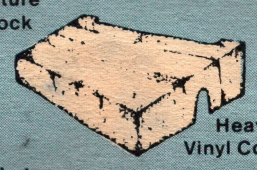

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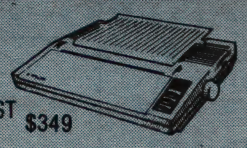

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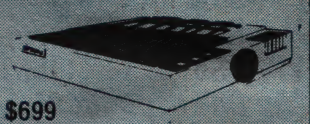

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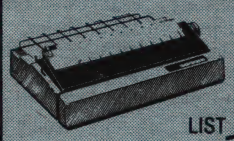

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Publisher ..... Glenn E. Patch
Assistant Publisher ..... Linda Rew
Editor-In-Chief ..... Stan Veit
Contributors:
Lon Andrews, Andrew Fried, Jeff Brenner, Randy Holcomb, Bill Chin, L.J. Kutten, Philip Chien, Don Lancaster, Ted Drude, Barbara E. & John F. McMullen, Mark Fendrick, Cheryl Peterson, Rich Fields, Les Solomon
Editorial Assistant ..... Ellen Lemmers
Composition Assistant ..... Charlotte Barbour
Compositors ..... Mary Faenza, Lori Conway, Anita Shipe
Art Director ..... Debi Hartling
Layout & Design Artist ..... Juanita McNeely
Graphic Artist ..... Bill Hutto
Advertising Coordinator ..... Sam Batts
Advertising Assistant ..... Nancy Altman
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Advertising Sales ..... Linda Ann Fisher, Larry Morrissette, Bob Harper, Eileen Hicks
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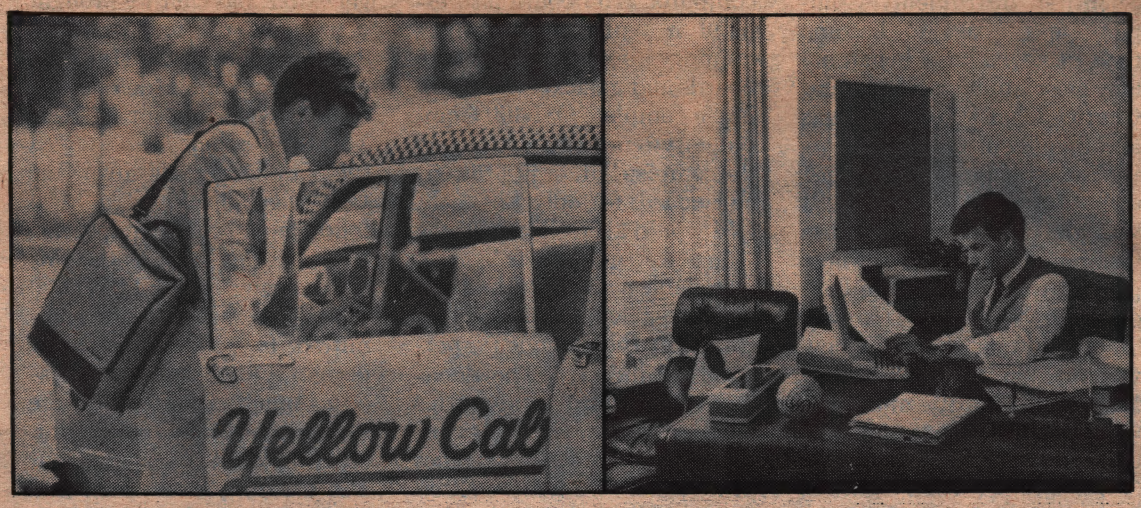
The Data General/One — True Functionality In a Portable

by Barbara E.
and John F. McMullen

The Data General/One is a wonderful machine. It is as well made as a battleship and, unlike many products in the microcomputer field, delivers all it promises. It is also too expensive and has a screen that is far from perfect. These statements, which may seem to be somewhat at odds with each other, lead us into both the intense excitement and slight frustration that comes part and parcel with an exploration of the "Data General/One." The "bottom line" on the machine is difficult to reach and herein lies the frustration. Would we purchase the Data General/One for our own use? An emphatic YES! Should you purchase it for your use? An equally emphatic WE DON'T KNOW! We hope only that this review gives you enough information to decide whether or not you have sufficient interest in the computer to go into a dealer for a hands-on demo (Warning - if you get that far, you'll probably buy the machine).

The Data General/One is a CMOS 80C88 based IBM PC compatible portable computer. The basic unit contains a full 25 line LCD screen, 256K memory (expandable to 512K) and one internal 3½-inch 720K microfloppy disk drive and sells for $2,995.00. Optional accessories include a second internal disk drive, an external 5¼-inch 320K disk drive, internal 300 baud modem, battery pack and recharger, portable thermal printer, an interface ("MPDA") for an external video device, parallel printer and 5¼ disk and an external expansion chassis for the utilization of IBM-PC compatible peripheral cards. In short the system, in a ten pound (actually 9.1 lbs. with two internal drives and no battery pack, 11.2 lbs. with the batteries) portable, contains everything the average person could wish for in a lap-size machine. Additionally, the system is extremely well made. All components from the computer itself to the carrying case reflect quality workmanship. There is nothing cheap or shoddy about any element of the system.



DG/One at home, in the office, on the road

Data General, which employs 17,000 persons worldwide and is best known as a manufacturer of quality minicomputers, utilized a team of engineers drawn both from its Japanese subsidiary, Nippon Data General, and from U.S. development groups in North Carolina and Massachusetts to design the Data General/One. The system units are manufactured near Tokyo at the Nippon Data General complex on a specially designed automated assembly line.

The most talked about element of the system has been the full size 80 character by 25 line, LCD screen with a bit-mapped display (640 x 256 pixels). On this topic there is both good and bad news. The good news is that the present incarnation of the display is much more readable than the initial version and is in our opinion, certainly of acceptable quality. The bad news is that it has a long, long way to go to approach the quality of the Compaq nine-inch monitor (contained in the Compaq Portable and Plus models), or even the text quality of the IBM Color Monitor. If you feel that quality approaching the Compaq display is mandatory, then the Data General/One is not for you. For ourselves, however, we have gotten accustomed to the screen and find that it is not of sufficient demerit to turn us away from the system. Whatever your individual decision is on this point, it should be noted that this is the only technical deficiency we find with the entire system.

The keyboard is a 79-key, full size Selectric style unit and resembles that of a portable typewriter rather than that of an IBM-PC. We found little difficulty in going back and forth between the PC and Data General/One keyboards. Specific differences on the Data General/One keyboard include:

a) The "PgUp," "PgDn," "Home" and "End keys" require the use of the "Shift" key.

b) The numeric keypad is toward the middle of the keyboard and shares keys with letters.

c) The ten function keys and the "Ins," "Del" & "PrtSc" keys are on a row above the numeric row at the very top of the keyboard.

We found that we like the feel of the keyboard better than the feel of either the IBM-PC or the Compaq keyboards.

The external 5¼-inch disk drive contains both the drive itself and the interface controller. Due to this engineering design, it is extremely bulky (and expensive - $795.00). The use of the 5¼-inch disk drive makes for a fine method of transferring files to and from our PCs and we have used it extensively with "Edix," "Volkswriter" and "1-2-3" files. It takes approximately 2 minutes to connect the 5¼-inch drive to the computer as the rear panel cover on the computer must be moved, the drive cable plugged in and two screws hand-tightened. A second 3½-inch drive is $300.

The traveling case holds the computer, power supply, battery charger, telephone connection, cords and a supply of micro-diskettes very comfortably. This unit is compact and no heavier than a standard portable typewriter. If we plan to be carrying it for a long time, we will leave the power supply and battery charger in the office and use the system on its internal battery pack (which has an operating life of 8 hours without recharging). The weight of the system is dramatically decreased by this procedure.

Although the system differs from most lap sizes in that it has the power to be utilized as a full power desktop unit (particularly now that Data General has announced a connection for a standard monitor and parallel printer ($399.00 + a $99 modification to the Data General/One), the main attraction for most of us is to be able to run the same software on both Data General/One and separate desktop units and to be able to exchange data easily between the systems. We have done this continually with a multitude of programs and can strongly attest to its compatibility (the only programs that we have

Continued on page 20

Portable Roundup

by Rich Fields

Portable computers have come a long way from the original Osborne 1 which started the family. This year's crop shows just how important these movable computers have become to the industry. They are divided into several types ranging from models which are only portable by the Army's standards "if a Battalion can move it, its portable" to small models easily carried from place-to-place. The large computers with handles include CRT's, floppy disks, hard disks, backup tape drives, modems and expansion capabilities. Smaller versions eliminate some of the "bells and whistles" and use a smaller CRT.

The next size is new this year, although some were shown at the Fall Comdex in Las Vegas in 1984. They look like portable radios with a front panel that opens to become a full sized keyboard. Behind the front panel is a flat LCD screen and most mount one or two floppy drives in the side of the case. These new

Figure 1 Quadram Datavue 25

computers are truly portable and offer all of the power of the larger machines except the CRT.

The lap computers are still very popular and new models include larger screens, floppy disk drives and even provisions for small printers. As the screens get larger and memory increases some of these get pretty heavy for a lap. They are becoming cornerstones for

Continued on page 8

Stan Veit's History

Ohio Scientific — Pioneer of the Challengers

From the first day I opened the Computer Mart of New York in 1976, it was a magnet for kids. They hung around as much as I let them, bright and eager to get their hands on a computer, any computer. I let them sit at the teletype and play Star Trek whenever it was not too busy, but they really wanted a computer they could own. One day I read an ad in BYTE issue #6 for a computer trainer based upon the 6502. It came completely assembled with an instruction book and only cost $99. Not only that, but after completing all the instructions and learning about the microprocessor, the student could return the trainer and trade it in for a single board computer kit, or for a blank board with instructions to build the Superboard. If the trade was made, the trainer only cost $10 to use. This seemed like the perfect thing to start the kids on so I called the Ohio Scientific Instruments Company and asked to become their dealer. Thus I began my long association with Mike and Charity Cheiky, the founders and owners of OSI.

We met in person at the first computer show ever held. It was the wonderful Trenton Computer Show of 1976 where people from all over the U.S. came to New Jersey to see, touch and talk about the new wonder, the microcomputer. Mike and Charity and their Ohio crew had come to show their Superboard System. The OSI 400 Superboard could be built with either a 6502, or 6800. You could populate it with eight 2102 Memory chips for a full 1024 Bytes (1K) of RAM, 512 Bytes of ROM, an ACIA serial interface chip for RS-232C interface or 20 MA current loop interface, a PIA for 16-parallel I/O lines and a power supply. Then if you had a terminal you had a complete computer. You could also expand it with one of Mike's memory boards, or video boards and a backplane board into a complete OSI 400 Computer system. You could buy the complete kit, or just the circuit boards for only $29 each. OSI would also sell you all the "hard to get parts" at a reasonable price. Mike had also designed a floppy disk interface (probably the first one for personal computers). The documentation and schematics were primitive. Manuals consisted of Mike's design sketches printed with his hand written notes and it was a little hard to figure out just which notes applied to the version you were building. However one hobbyist helped another until they got it "up and running" and the finished product was a very good computer.

When OSI completed their first complete "factory built" computer called the Challenger, Mike and Charity brought it to New York and I hired a meeting room at the Hilton to give the first public demonstration. It was a success in New York and when OSI showed the Challenger all over the U.S. they developed a loyal following for their equipment. It was not as large as the IMSAI, Altair, or SWTPC 6800 crowd but much more committed to Mike's ideas and designs. Other designers packed as much circuitry into the smallest possible space, thus creating neat packages, but also creating excess heat and Radio Frequency Interference (RFI). Mike Cheiky built computer boards that were large and had few parts on them. These boards could be expanded and still meet the Underwriters Lab specifications for electronic equipment. OSI used its own 48-pin bus with a backplane made with low cost Molex pin connectors that provided trouble free connections. The OSI cabinets were large with lots of room for convection cooling without noise-creating fans.

The price of the Challenger computers was much lower than other computers of that time, and they came completely assembled. The Basic Challenger 65-1K (1K or RAM!) with serial interface was $439. If the 1K board sounds strange to you it was because you could keep adding chips to an OSI memory board. (They didn't sell a board without chips because they needed some to check out the machine.)

With the 4K model for $529 you could run Tiny BASIC without expansion, and if you bought the 65V-4K model you got a built-in video terminal so you didn't need a teletype. This first top-of-the-line OSI com-

Continued on page 10

Portable Roundup
Continued from page 7

full transportable computer systems.

The hand-held computers seem to be losing ground to the lap models. Except for dedicated applications the hand-held computer seems to have too many limitations in size and memory for practical general computer use.

In passing, I must mention the ultimate portable, a terminal that you wear on your wrist! Sieko has produced this little machine which can store up to 2K of data and talk to PC's. This is truly a machine looking for an application.

Quadram Datavue 25 A PC Compatible Portable

This new portable from Quadram Corp, (see fig. 1) well known supplier of PC add-ons works like a desktop computer. It is a MSDOS computer that includes a 360K floppy disk drive, a cordless keyboard and up to 640K of RAM memory. The screen is a full 80 character by 25 line LCD display with a four shade graphic mode having a resolution of 640 by 200 dots in the text mode and 320 by 400 dots in the graphics mode. For easier reading the screen can tilt to six different positions but like all LCD screens observation can be very difficult in direct ambient light conditions.

Datavue 25 can be plugged in anywhere or powered up by using an optional rechargable battery pack which seems to run the unit for about 1½ hours per charge. There is also a 220-volt adapter for countries using that voltage.

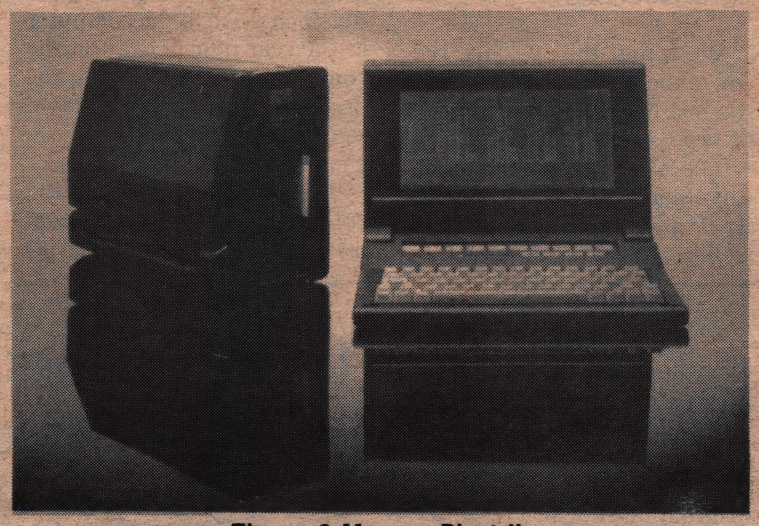


Figure 2 Morrow Pivot II

The Datavue 25 seems to run most MSDOS software without trouble. The 640K version provides a RAM disk that can operate as Drive B: or even can be designated as Drive A: This allows copy protected programs to be used with the portable, or the program to be run on the RAM disk with the floppy to be used for data. A second floppy is available as an option.

Quadram Corporation is part of Intelligent Systems who made the Superbrain computer and who also owns Princeton Graphics. This portable is made in Japan for Quadram and seems to have many features that set it apart from others that look like it. The keyboard for example is a full sized low profile unit with 83 sculptured keys. It can be removed from the computer and connected by an infrared beam. A cable is also provided for conditions where the infrared beam cannot be used.

Options for the Datavue 25 include an expansion box which allows full sized PC cards to be used with the portable. An internal modem card and carrying case are also available.

The Datavue 25 sells for $2195 for the 128K version and $2,795 for the 640K model. Due to the RAM disk feature on the 640K model, I would not suggest that the smaller version be purchased unless the user never uses the popular Corporation, 4355 International Blvd., Norcross, GA 30093, Telephone: (404) 923-6666.

Morrow Pivot II Portable Computer

The Morrow Pivot II (Fig. 2) replaces the Morrow Pivot which was introduced at Fall Comdex in Las Vegas. The previous model had an 80 column by 16 line screen whereas this unit is equipped with an 80 by 25 line display. Owners of the Pivot can upgrade to the Pivot II by trading in their computers and paying $1,000 for the newer model with the same amount of memory.

Looking at both Figures 1 and 2 you will notice that both computers have the same form, but different features. The Morrow Pivot can be equipped with either one or two internal disk drives whereas the Datavue 25 has one internal drive. The Morrow Pivot II has a drop-down, non-removable keyboard and the Datavue has a removable keyboard with a cordless connection system.

The main difference between the two portables is in the display facilities. The Morrow Pivot has a color video out capability which permits connection of either an RGB or composite standard color video monitor and in addition employs the Morrow LumiCon (TM) display. This is a combination of electro-luminescent back-lighting with the LCD viewing screen and includes a propietary nonglare screen coating material. The purpose of this combination is to lessen the glare on the screen making any LCD screen hard to read. While this system does produce a much more readable display, it does not meet Morrow's claim that the screen is legible under any lighting conditions. I do rate it most readable among LCD screens.

The two 5¼" standard floppy disk drives are also a plus for the Morrow Pivot II comparing them with the 3 ½" drive on the Data General DG/One I would prefer the extra bulk of the Morrow to the problem of using nonstandard (for MSDOS computers) disk drives. Morrow also provides as an extra cost option, a bus expansion box that converts the Pivot into a desktop that can use hard disks, or LANs. Other options available with the Pivot are an internal modem operating at either 300 or 1200 baud. A rechargable battery pack is also available as an option.

The Pivot II with a single 360K drive and 256K of memory is priced at $1,995, $2,995 with 256K of RAM and two floppies and $3,795 with two floppies and 640K RAM. The internal modem, video-out and battery are standard on the dual drive models and are extra cost options on the single drive unit.

For information: Morrow 600 McCormack, San Leandro, CA 94577, (415) 910-2137.

Zenith Data Systems Z-171

The Zenith Z-171 (Fig. 3) is almost indistinguishable from the Morrow Pivot, except for the color and trim. The Zenith version features 256K RAM expandable to 640K and the backlite LCD display. The

Continued on page 22

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Travelling With Your Micro

by Philip Chien

Microcomputers come in various degrees of portability:

1. Non-portable desktops (e.g. IBM-PC)
2. Desktop systems which can be easily shipped (e.g. a small Apple IIe system)
3. Transportable units, usually the size of a sewing machine, and only considered portable because they have a handle (e.g. Osborne, Kaypro, Eagle PC)
4. Lap size portables, either with a small screen (e.g. Radio Shack Models 100/200, Epson Geneva, HP Portable, etc.) or with a full screen (e.g. Grid, Data General One, Apple IIc with the optional LC Display).

If you have a heavy desktop unit, then for all practical purposes it will stay in one place, but if you have a more portable unit, then you may wish to travel with your computer on business trips or carry it back and forth between your office and home.

The first and most important rule for travelling with your computer is to keep it with you at all times. Like all valuables, it should be kept on your person. Never let your computer get packed as checked baggage, or leave it visible in the back of an open car. When packing, get a good sturdy carrying case for your computer. If you expect your system to be jostled around, you may wish to get a hard carrying case. Don't forget to pack the little things like power cords, television adapters, extra blank diskettes, a small screwdriver or tool kit, and a 3 prong-to-2 prong grounding adapter in case you encounter a two-slot outlet.

Always make sure that you are using backup copies of any software and data diskettes which you need. Make sure that you also have a second backup set packed separately. When you get to your destination, your disks may get separated from you and if you don't have a second backup set you will be in trouble. Don't forget that your data diskettes may be the most valuable part of the entire computer system.

If you travel by plane, allow extra time for travel to the airport and have your computer hand-searched by the security guards. **DO NOT let your system be X-rayed.** Although the X-rays shouldn't harm the computer, they may erase certain types of memory chips. The magnetic coils in the transmitting tube may also erase floppy diskettes. Better safe than sorry!

While in flight, different airlines have different regulations. Some airlines don't care whether or not you use your computer, and others will not allow you to use it since it may interfere with the plane's electrical and radio systems. In 1980, American Airlines flew dozens of computers, calculators, dictating machines, and even toy radio controlled cars, and determined that none of them would interfere with their systems. However, it is best to check with your airline ahead of time if you intend to use your computer while on board. Recently, the FAA issued an addendum to the Federal Air Regulation 91.19, which allows the use of pocket calculators and pacemakers, to include computers and video games. The FAA came to the conclusion that personal computers do not interfere with the operation of aircraft navigation and communications equipment. When the rules go into effect, all U.S. airlines will allow you to use your computer during cruise periods. During takeoffs and landings your computer must be put away along with the rest of your carry on luggage. Until the ruling becomes law, whether or not you can use your computer is up to the discretion of the airline and flight crew.

If you are aboard a small private plane, I do not recommend using your system while inflight. Since you are much closer to the cockpit and flight instrumentation, your computer will interfere with them much more than if you were in the body of a large jet.

After you arrive at your destination, you may find out that nobody knows what you need for your computer to be hooked up. Simple things like an extra plug outlet for a printer can stop an entire sales presentation until an open hardware store can be found. Call ahead and inform your party what your requirements are.

When you're in your hotel room you'll have different problems. If you need to hook up your computer to the hotel's television set, contact the front desk first. Many hotels have TV anti-theft systems which sound an alarm at the front desk if the antenna is disconnected. Make sure that the hotel's television is compatible with your computer; some hotel sets cannot tune in the special channels (e.g. UHF) needed for your computer. When hooking up your modem in the hotel room, make sure that you bring an accoustical adapter. Most present modems plug directly into modular phone jacks, but very few hotel rooms have jacks available. Jensen Electronics sells an adapter which replaces the microphone and earphone in the handset of normal phones and changes the signals into a modular jack which you can attach a direct connect modem to, but you have to be able to unscrew the mouthpiece and earpiece of the phone to attach it. Some modems have accoustic adapters which are available as an option which cover the phone's handset and will work with ALMOST any phone. If your terminal program auto-dials, then don't forget that you will usually have to dial a "9," wait for a second dial tone, and then dial your number. Also, don't forget that the area code will probably be a different one from your home area code, so you may have to reset your terminal program's dial macros.

Continued on page 13

Veit's History
Continued from page 8

puter cost $675. If ordered with the computer, you could get 16K memory boards with 4K on board for $139 each. You were limited to 3 of these because it was a big bargain. Sixteen K Memory boards were almost unheard of in those days! If you ordered 12K or larger you got the full sized Extended BASIC free! Wow! There was even a floppy disk for the Challengers, $990 for a single drive, $1,440 for two. What they didn't tell you was they had only a preliminary DOS without a directory! You had to keep track of what was on the tracks by listing it on a piece of paper.

Another pioneer idea of Mike Cheiky's was the use of multiple processors co-existing in the same system. The Challenger 3 had a 6502, a 6800 and a Z-80 all on the same CPU board. At first there was only software for the 6502, if you wanted to use one of the other microproccessors, you were on your own. Later this capability provided the ability to run CP/M as well as the OSI operating system OS 65.

This flexibility of the OSI design was also the reason the Challengers were one of the first computers to have a multi-user system. Not only was Mike Cheiky one of the first to design a floppy disk system for his computers but he was the first to add a Winchester hard disk to a personal computer. The Okidata Company had a 14-inch 84 Mbyte disk drive which Mike interfaced to his Challenger personal computer at a time when most PCs were using cassettes to store data! For this reason OSI got a head start in selling to the business market.

If you asked me in 1977 which companies would last into the next decade, I would have never picked OSI. As a company they were badly organized and almost impossible to do business with. They were undercapitalized and very slow to deliver ordered equipment. This lost them a lot of the business they could have obtained because of their technical ability.

In 1978 they attracted investment capital and went into both the business computer field and into the very low end of the business. For a long time it seemed that the thing they did best was to advertise and sell equipment. The low priced personal computers never lived up to the promised performance unless the user learned a lot about the machines. They never could compete with TRS-80, Apple, or Atari although OSI low priced models sold for less and had more features. The main problem was lack of software support. OSI locked out third party software developers who then turned to Apple and TRS-80 and wrote no software for OSI machines.

At the peak of OSI's popularity they were bought by MaCom a large communications firm who wanted to get into the PC industry. The first thing they did was to get rid of Mike Cheiky and stop the low cost hobby end of the business. Mike and Charity Cheiky started Santa Barbara Research Co. to build super office computer systems. MaCom looked like they were successful in turning OSI into a business computer company, but the competition was too rough so they sold OSI. The buyer went bankrupt and the company was put up for sale. A company named ISOTRON purchased the name, but not the company. They are now building 68000 Unix computers and a few older designs using the OSI operating system OS 65U. The name OSI is still used for this line of business computers. Some of the old distributors with the original OSI still may make replacement boards for the Challenger systems but I haven't heard about them recently. ●

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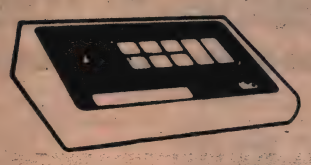

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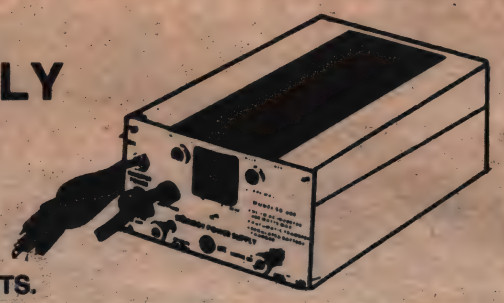

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Editorial

By Stan Veit

Comdex Thoughts

I have just returned from Comdex in Atlanta, a much larger version of the Spring Comdex held last year in the same city. In spite of the fact that many more exhibitors showed their products and as many as 50,000 people attended, there was something missing from this show. The Interface Group did their usual, highly professional job of show production, but even they couldn't instill the carnival spirit that existed in past shows. Perhaps there have been too many company failures, discontinued computers and software fiascos in the past year for people to be excited at another computer show. Perhaps its just because the fun has gone out of the industry and a grey tone of sameness permeates the atmosphere. The culprit seems to be IBM PC clone-ism. Wherever you looked there were PC or AT clones, or "better-thans", all kinds of MSDOS computers in portable, desktop and floor-standing models. Software also had that stamped-from-a-mold look. Only in the AT&T room where the grey suited AT&T'ers stood (no chairs) was there any computers that dared to be different. The problem there was that the people working the exhibit acted like the automatons you see at Disney World. They were programmed to give a fixed demo. When you asked a question not in the program you could not get an answer. If they had any idea how to market to the computer industry, AT&T could really make waves with UNIX, but they don't and they won't. Typical of their attitude was their "party" at the Omni which excluded the press and the vast majority of retail attendees. (The same people others begged to attend.)

Apple was conspicuous by their absence, so was Commodore, two manufacturers that could have injected a bit of variety into the proceedings. When Atari showed up with the Atari 520ST and held a press meeting staring Mr. Jack Tramiel, Chairman of the Board we got some real excitement. Jack Tramiel said that Atari decided to attend Comdex, just five days before the show and the motive was to sign up dealers for the 520ST "JACINTOSH." When asked if this meant a change in Atari's marketing policy, Jack said, "Yes, it did." They will still do the bulk of their marketing to mass marketers, but complete systems will only be sold through dealers. The discounters will get a cheaper version to sell, but no complete systems.

When asked where he would get the money to produce the new computers, Jack Tramiel said, "I'll take it out of my own pocket." The reporters then asked why Atari came to Comdex after cancelling their attendance at the Spring CES Show. Jack replied, "I came here to get dealers, which I have. At CES I would only be talking to the mass marketing stores which I've already signed up, so I am saving a lot of money not going."

In our efforts to bring you the outstanding writers in the industry we have obtained the services of the Father of Personal Computing-Les Solomon, to write articles for us. Les has retired after 26 years with Ziff Davis where he was Technical Director of Popular Electronics and Computers & Electronics magazines. When our technical electronics writer, Luis Van Delray had to return to his native Mexico, leaving us without an article, I got Les to take his place, out of friendship. (I could not otherwise afford his services.) This means that we now have some of the real pioneers of personal computing writing for ***Computer Shopper,*** namely Don Lancaster, Les Solomon, and Ye Editor, more are on tap for the near future.

Reprints Available Soon

I have received many letters and phone calls asking for back issues of Computer Shopper so that readers could obtain specific articles published in the past. Unfortunately we do not have back issues to fill these requests and cannot obtain them. Glenn Patch, our publisher has decided to allow us to reprint leading series in a 81/2" format and supply them to readers at low cost. It will take us some time to get the reprint material into the proper format so we will advise you when they are ready. The first series will be Ted Drude's Commodore 64/VIC-20 material and Randy's Ravings for TI fans. Mark Fendrick's columns and Jeff Brenner's columns will also be made available. We will only be able to supply these reprints in groups since the handling cost for individual parts will become excessive. If you have any other requests for reprint groups, drop me a line and I'll see what I can do about it.

Electronic Publishing

Last month I mentioned that we were about to embark on a new venture in Electronic Publishing with General Videotex Corporation's Delphi Network. Patch Publishing has signed a contract to provide services on the Delphi Network consisting of Electronic Shopping information. These bargain sales offers will be available as part of the various Special Interest Groups (SIGS) now forming, or operating on Delphi. The SIG member will not have to leave the area to read the special offers relating to the computer of interest since it will merely be a menu selection on the SIG. The offers will consist of bargains from Computer Shopper advertisers directed to the special groups on the SIGS. Here you will find special introductory prices and specials offered nowhere else. This is just another example of our commitment to save money for our readers. We have also arranged FREE sign-up on Delphi for Computer Shopper subscribers as another part of our service to you, our readers.

In the near future we will also support a Directory of Used Computer Prices, direct contact with your editorial staff, Software Shopping List, User Group and Bulletin Board Information in a private area accessible to our subscribers. Further down the road we will create a complete electronic magazine updated on a daily basis. Join with us in starting the age of electronic publishing. ●

LINDENHURST **by Corey Strongin**

Traveling

Continued from page 10

IIc or similar computer and use it primarily in two locations (two offices; your office and a client's, home and office, etc.) you may wish to save yourself problems by buying a second monitor and power adapter. Then you will only have to carry the IIc back and forth, and leave the heavy monitor at one location.

Travelling abroad with your computer can be simple - or a nightmare. Make sure that you plan in advance. First, check with the consulate of the countries which you plan to visit. Many countries require import/export permits in which you declare that the computer is for your own use and not for resale. If you don't, then your computer may be impounded and not returned to you. If you bring or ship more than $1,000 worth of computer equipment, then the U.S. government may want to know about it. Depending on the country, there are various regulations on how much you can bring out or into the U.S. Contact your Customs or Passport office for details.

Several countries, including Belgium, Denmark, France, Holland, Italy, Spain, and Switzerland, among others, still refuse to hand search luggage; and demand that all baggage be X-rayed. Be prepared, in case disaster strikes. Also, be aware that although U.S. authorities demand that airport X-ray machines be inspected and measured every six months for possible radiation leakage, other countries may or may not be as strict with their airport security equipment.

If you are planning on bringing your modem with you, you'll have even more problems. Although you may have used your modem to call a user in the country you have visited dozens of times, once you enter that country you're subject to its regulations; and, although the hardware will work with no problem, different countries have different laws applying to modems. West Germany, for example, requires a government permit. In addition, in some countries a "data quality" phone line may be required. A normal voice line in many countries may not have good enough quality for data transmissions.

When packing for travel abroad, make sure you bring extra supplies with you. Diskettes, ribbons, paper, and other supplies may not be available where you're going. If you do pick up paper in another country, it will probably not be standard 8-½" by 11" paper. You may have to reconfigure your word processing program to handle metric size paper.

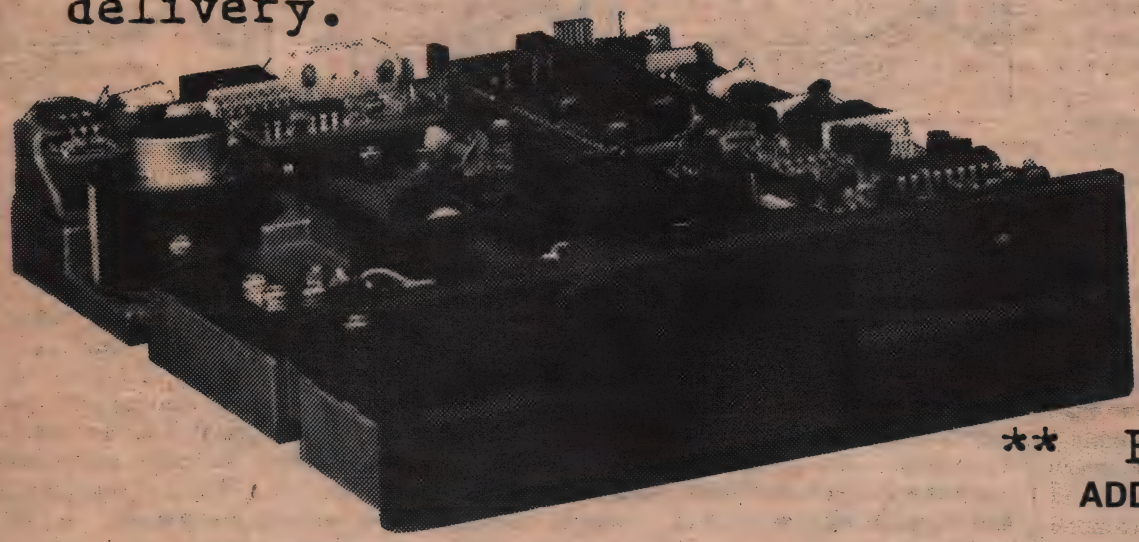
If your overseas trip is very important, or very long, then you may want to take your technical person with you. It is very difficult to get good technical advice in strange places. In addition, be aware that any warranty you have on your unit is only valid in the country where the unit was purchased. A dealer in the country you are in may not even have the correct parts to fix your machine. Also be aware that the company you are dealing with may not be related to the company with the same name back home. "Apple Computer, Inc." in Switzerland is actually a warehouse run by a Swissair pilot who purchases legitimate Apple computers in the U.S., carries them in his personal baggage, and sells at a large profit. He just registered the name "Apple Computer, Inc." before the boys in Cupertino even thought about selling Apples in Europe!

If you are going to be in a place where the current is 220 VAC you will need a transformer. Most computers intended for use in North America are designed to operate on 110V, and if you plug them into a 220V line, you can destroy them. 50/60 hz doesn't make a difference for most computers, but your monitors and printers may be designed only to operate on 60 hz. If you are in a 50 hz country, check your manuals, or with the manufacturer, to determine what changes must be made. The unit may work without any problems whatsoever, or it may be as simple as changing a switch or

Continued on page 20

BULLETIN

OCTIPLUS Inc., as an introductory offer, announces the sale of the Qumetrak 142 5 1/4" Floppy disk drive. This drive is approved for use in the IBM PC, Compatibles, and IBMPC jr. and in almost any other PC needing 5 1/4" 40 track 2 sided double density drives. The regular price of these drives is 199.00 but for a limited time we are offering these fast stepping drives for the fantastic price of just 69.95 per drive. Quantitys are LIMITED so OEM's and dealers need to move fast to insure timely delivery.



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FEEDBACK FORUM

Letters From Our Readers

Dear Editor:

I just finished reading your editorial in the February issue of Computer Shopper and I enjoyed it very much.

I started getting involved with computers only recently (about 3 years ago), but I have been familiar with electronics as an amateur radio operator ("HAM") for over 15 years.

About two years ago,the school at which I teach bought a slew of Apple II+'s and C-64's and "dumped" their old computer. Since I was the local hardware-hacker, I ended up with an IMSAI 8080 with a Northstar DOS-Micro disk controller MDC-A4/Shugart 400 drive. It has four 8K static RAM boards from Industrial Micro Systems.

Over the past two years, I have been playing with it, programming through the front panel switches. I have been able to learn much about machine-level languages and it's been a lot of fun. However, I have one nagging problem. I haven't been able to interface it with my VIC-20 as a terminal. I feel there may be a bad chip on the IMSAI MIO-REV2 Board as the IMSAI will not recognize the VIC. I'm using a RS-232 interface to the Serial I/O of the MIO Board. Using a Terminal-40 program, I matched the baud rate, parity, etc., but nothing has come up on screen. I also wonder if the one disk that I was given actually has the Northstar Basic on it as was claimed.

In any case, I can't afford to go through normal channels to have it checked out (i.e. Fischer-Freitas, Computer Performance).

The documentation that I have is meager to say the least. I have manuals and schematics for the MPU, CP-A, and MIO Boards but nothing for the DOS or Static RAM Boards. All voltages seem to be OK and the Disk Controller appears to be operating.

I realize what a treasure this machine is and I don't really want to give it up. It would be really nice to have it working with a terminal unit as the front-panel programming becomes tedious after a while. Is there a User Group or groups that we could contact to discuss this problem? There must be someone out there who knows something about the IMSAI 8080 and Northstar DOS. Most people I've spoken to never even heard of this computer.

If you can help in any way we'd sure appreciate it.

Mark D. Samis

Dear Editor:

Your March '85 issue has a large number of entries in the table of contents for CP/M; but upon closer examination, only one item has anything to do with CP/M — the new Spectravideo home computer. Everything else is a grab-bag of unrelated stuff; hobbyist of the year, reviews of the early days, a new PDP-11 system, etc.

To add insult to injury, the list of new public domain software was entirely for the PC — and almost all of this as it turns out, is CP/M software converted for the PC. Apparently you feel that CP/M is a relic along with 8-bit computers and a column filled with trivia is a good way to gently part company with this subject.

Actually, you could not be more wrong; the already large volume of CP/M public domain software is growing at an increased rate, and much of it is for the 68000 processor which can run rings around the PC and its cousins. Despite the multiplication of small diskettes, the 8-inch CP/M disk remains one of the few standards in the micro world. And as you point out in another section of the magazine, CP/M is absolutely vital for newly introduced machines to compete in the marketplace — the new Commodores and new Japanese machines being two examples.

On another subject, I was surprised and even disappointed when I saw the article about making a printer stand from aluminum scraps; the finished product is full of sharp edges, is hideously ugly, and is not easy to make. Far better in my opinion, is a printer stand like mine — made from one of the decorative wooden "cubes" found in many discount stores. They are made of pine, can be glued together in minutes, can be painted to match any decor or left plain, and have neat rounded edges. A slot cut in the back or bottom will feed the paper to the printer, and only common household tools are needed. My advice to Computer Shopper: stick to reviews and advertising; leave the technical projects to magazines that can do a better job in that area.

John F. Lenihan

Dear Editor
& Randy Holcomb:

A while back I received a sample Computer Shopper in the mail with an article on the TI-PC. Being an owner of one, I subscribed for one year and since that time the only mention of TI computers has been of the defunked TI/99. I see nothing wrong with keeping the TI/99 owners informed but let's face it, there is a whole new product line that should be reported on also. Since your first article on the TI-PC, Texas Instruments has come out with a compatible portable and a really neat compatible lap size system, but the only thing I read about in the Computer Shopper is the TI/99. I subscribe to two other magazines devoted 100% to the new TI product line so there must be something to say about the new PCs. I think it's great how Randy has kept up with the TI/99 because there must be a lot of TI/99 owners feeling left out in the cold about now, but there are a lot of TI-PC owners out there too trying to get information about "present" products so please don't ignore us!

Gary Jones
Streamwood, IL

Mr. Editor:

Yes, please continue your articles on Heath/Zenith computers in Computer Shopper. I found your March 1985 article very useful and informative.

I have recently purchased a Zenith 151-52 320K, two disk drive PC through our university program at IIT in Chicago. Being a complete novice as far as PCs go, I find articles like yours on Zenith PCs very useful. Unfortunately, after scouring through many computer magazines, I can find hardly any articles on the Heath/Zenith line of computers. IBM, Apple, Tandy and Commodore PCs — yes; Heath/Zenith — no. So PLEASE continue your articles.

Gilbert R. Speich

Dear Editor:

Here's saying "congratulations" on and "thank you" for the fantastic *Computer Shopper*, which makes computer products available at such great prices.

I purchased an Apple IIe in 1983 to learn programming and do writing of text and translation (I'm fluent in German) and at home. Time and money were wasted on Applewriter (fair), Word Handler (okay) and Format II (don't ask). I've been a Word Processing Supervisor since 1981, principally on CPT and Wang, and have also worked with IBM's Displaywriter, Syntrex and Multimate. Obviously, I needed professional level software at home as well, but the prices were too high. I discovered *Computer Shopper* in August of 1984, and was able to purchase a very complete WordStar package, which included the StarCard, WordStar, SpellStar, StarIndex and CP/M operating system software — for $353 complete(!!) from one of your advertisers, Crazy Bob's. For a similarly excellent price of $135, I picked up the extra disk drive that I needed from Computer Discounters in Philadelphia.

My "personal productivity" or whatever you want to call it has really risen with this advanced combination. Since I was at home with computers before purchasing my Apple, I had no trouble whatsoever getting it to work.

By the way, where did WordStar get the reputation for difficulty? Commands are all logical and easy to remember. And the Help Screens obviate the need for memorization. WordStar is far easier and more sensible than many dedicated systems, and a better value than the lesser home use program I bought.

WordStar's manual is perfect — and I've written documentation for and done training of my share of "idiots." One article even claimed that only people who belonged to Mensa — an association of people in the top 1% I.Q. wise — could understand it. Admittedly I'm bright and *do* belong to Mensa (or used to — the people were just too icky and I dropped it), but this has little effect on my ability to use the program.

I made all pre-WordStar purchases from conventional dealers, because I wanted the reassurance of dealer support. However, I was well-versed in computer operations, patching, etc. and this wasn't necessary. I spen over $400 on word processing software and $250 on VisiCalc. All worked perfectly, and I had no problems, questions or need of the service that accompanied those full-price purchases.

The Computer Shopper gave me the chance to work with professional-quality software which would have been beyond my price range had I purchased it from local dealers. Even "47th Street Photo," a famous New York City "bargain" store (actually, it's on 45th Street, which tells you something about them right there) was charging over $700 for all the WordStar items I purchased above. They were not available in package form, and the individual prices — especially the StarCard, at $250 — really drove up the cost.

Another interesting note: I bought my Apple IIe at Datel Systems, a big, fancy computer store with all the trimmings. I'd returned for occasional, small purchases, but a December 1984 visit (admittedly 17 months after my Apple purchase) proved fruitless: The store had disappeared! This store was located in a nice, reassuring, fancy skyscraper, and even the building guard in the lobby did not know where they'd gone. "They just left overnight!" he said. Now, as I said above, I never needed Datel's service, because the Apple works great, and I have no problems in configuring software packages for it. Still, this proves that there's no advantage to buying from an elaborate, high-priced store on the theory that the place will always be around to provide support. If I were presently buying a new computer, (I want an IBM or compatible, but that's too steep now) I'd certainly go with a *Computer Shopper* merchant.

One disturbing trend: The growing lack of professional-level software for the Apple. On Wednesday, January 9, 1985, I telephoned *Computer Shopper* advertisers all over the country trying to get MicroPro's CalcStar, and found that it had just been discontinued for the Apple. I'm

Continued on page 176

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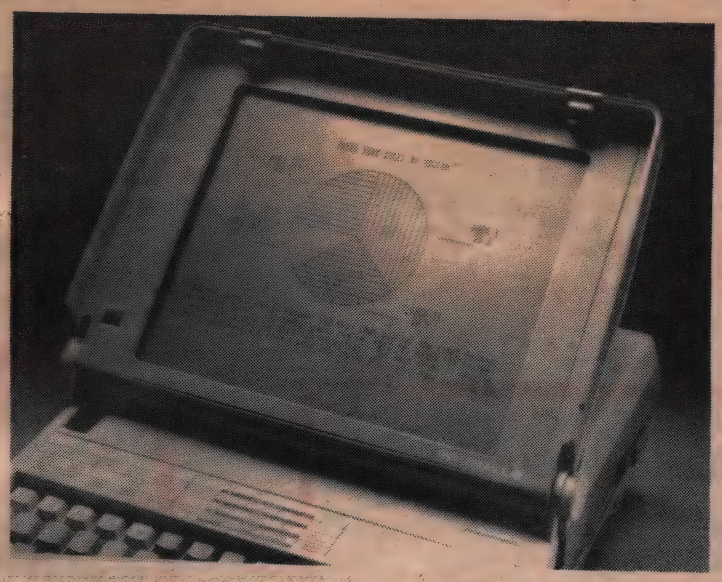
Data General
Continued from page 7

found that do not run properly are those that are dependent on specific disk formats like the Norton Utilities and some of the universal copy programs and communications programs that do not recognize the internal 300 baud modem).

This is not to say that the system will run right out of the box that the IBM 5¼-inch version comes in. Copyable programs such as "Edix," "Volkswriter" and public domain software may be copied directly to the 3½-inch diskettes and run as though they were running on a PC or Compaq. Copy protected programs such as "1-2-3" that have been "de-protected" through the use of some of the existing utilities may also be copied to the 3½-inch diskettes and will run properly. The difficulty arises when we try to run protected software in its 5¼-inch format directly from the external floppy drive. In some cases it works and in some it doesn't; the success or lack thereof is dependent on the protection scheme. For example, we have not been able to run the early versions of "dBase III" or "Framework" from the large drive (the "Pro-Lock" method of protection won't recognize the original program diskette in drive C (the 5¼-inch drive) and we were not able to redesignate the 5¼-inch as A). Additionally, the fact that the programs that normally can be used to backup these protected products do not work when we attempt to make the output a 3¼-inch drive means that many protected programs in their IBM format are useless to



the Data General/One (even those that will run from the 5¼-inch drive have limited use as those of us that wish to use the system primarily as a portable have no plan to lug the external disk drive, which requires AC-power and will not run off a battery around).

There is luckily more and more software becoming available in Data General/One format directly from the manufacturer. We have run Data General/One versions of "1-2-3," "Framework," "ThinkTank," "dBase III" and "TK!Solver" with no differences in their operation. Data General has a long list of software available directly from the manufacturer in Data General/One 3½-inch format and we expect this list to grow as the system increases in popularity.

While the availability of the protected software in both 5¼-inch and 3½-inch formats certainly provides us with the capability of running the same system, this availability, which gives us the opportunity to spend $695.00 for our 5¼-inch copy of "Symphony" or "Framework" and then another $695.00 for our 3½-inch version, is at best a mixed blessing. Although a discussion of this entire subject with all the issues of "site licensing," piracy, user rights, etc. is beyond the purvey of this review, suffice to say that the average person may feel dubious about purchasing a Data General/One if he realizes that he is committing to a long future of double software purchases (particularly when he will only use one version at a time). This issue is one we feel the software manufacturers will have to come to terms with - either by offering another copy of software in a different format, without documentation and at a reduced price to registered owners, or by adopting protection schemes similar to the one advocated by Lotus and others that provides a portable hardware "key" that may travel from machine-to-machine with copyable diskettes.

The Data General/One system is quite expensive. A 512K unit with 2 internal drives, the battery pack, charger and external 5¼-inch drive lists for about $6,000.00 (any user who is going to use a spreadsheet or integrated package such as "1-2-3," "Framework" or "Symphony" is well advised to consider only the 512K system. The system requires 80K merely to manage the LCD display graphics, so the 128K system has only 40K left for user applications making the system virtually useless for any serious use. The 256K system is satisfactory if word processing is to be the sole use but too tight if spreadsheet processing is required. The increase of memory from 256K on up costs $39.00 to begin to add memory and $599.00 for each 128K to be added. The expensiveness is carried right down to the cost of the micro-diskettes (double sided) which list for $70.00 for a box of 10.

Invariably, reviews of the Data General/One have compared it to the Hewlett-Packard Portable (previously known as the HP 110). We feel that most of these comparisons have been strained and brought about by the fact that both machines are extremely well made and were developed by well-known firms that have previously specialized in minicomputers. The HP portable is not a full function MS-DOS machine that runs all compatible software; it is rather the ultimate "1-2-3" machine. It runs this program, which is contained in ROM, incredibly fast and should certainly be considered by anyone whose prime computer activity is the use of "1-2-3."

Generally, we have been extremely pleased with the Data General/One. We have used the system extensively for three months with little problem and a great deal of satisfaction. During that time, when we were not testing products, our primary, almost exclusive, use of the system has been to utilize a word processor (at times "Volkswriter" or "Framework"; usually "Edix") for the writing of articles and reports in locations other than our office. The final output is then transferred to the PC via the external 5½-inch disk for printing. When used in this fashion, there can be no fault found with the system. It, in fact, is superior in at least one aspect to using a floppy-based system for word processing in that the internal 3¼-inch data diskettes hold twice the information of the desktop's drives. We feel that this feature coupled with the fine keyboard and portability make the Data General/One particularly attractive to writers (a view shared by Peter McWilliams in his syndicated newspaper column).

Other professions that we see having special interest in the Data General/One are engineers (who will find specific benefit in the use of "TK!Solver" and engineering "SolverPacks"), auditors, consultants and any other type of business that requires a good deal of work away from a normal office location. We have also spoken to some program developers who have transferred the Latice C Compiler to the micro-diskettes and are programming "on the fly." They are as pleased with the system's performance for this function as we are for word processing.

We discussed the Data General/One with Dan Bricklin, Chairman of Software Arts, Inc. (recently sold to Lotus Development Corp.), who we knew was an enthusiastic user. In describing how valuable he finds the system, he pointed out "The difference between having a portable fully functional MS-DOS system and not having one is quantum and, in my judgment, well worth any difficulty with the screen. With the Data General/One, there is no trade-off to limited versions of programs to run on the system; all programs have the same features whether run on the IBM-PC or the Data General/One. Additionally, Data General has already shown by its screen improvements that they are committed to supporting the system and, as an owner, that's a good feeling."

We agree wholeheartedly with Dan's assessment and, in summary, recommend the system to any person who has ascertained that the convenience provided by the Data General/One is worth the relatively high price-tag. Once the system is cost-justified, we have no difficulty attesting to its performance. We further reiterate that for our personal use it is well worth the cost.

The Data General/One is available through a variety of channels including nearly four hundred computer retail stores and Data General's existing direct sales force and OEM network.

NOTE: This article was written on our deck in Jefferson Valley, New York, using the Data General/One with Edix & Spellix, transferred via the 5¼-inch drive to a Compaq Plus and was printed using Wordix. ●

Travelling
Continued from page 13

jumper, or you may need a different monitor or printer.

If you decided not to lug a heavy monitor all over your journey, and decide to purchase a monitor locally, be aware that there are various different television standards throughout the world. The U.S. uses the NTSC (National Transmission Standards for Color) standard for composite video monitors, but most of Europe uses either the PAL or SECAM standard. Unless your computer can produce the signals needed, look into obtaining a NTSC monitor in the country you plan to visit, or buy a bigger suitcase.

After you solve the power problem in your printer, you will still need to solve the language problem. The standard ASCII character set which most printers use is fine for English, but doesn't include any of the special characters or accents used in other languages. Fortunately, most dot matrix and daisy wheel printers have the capability to change their character sets into international characters. You may need to change a printwheel, flip switches, or send software commands, but with 75% of the printers available, you can print in most languages. Naturally special languages which don't use the Roman alphabet like Greek, Russian, Hebrew, Arabic, and Katakana (Japanese) are not usually available, but there are a few printers available which will support those languages, either directly or through special software.

The characters on your video monitor are usually a little harder to change. The Apple III and Macintosh family use RAM character sets, so on those machines any different character set can be easily defined. However, most other machines have their character sets permanently etched in ROM. If your programs need to display information in different languages, you may need to have the character set, and possibly the keyboard in your machine altered. Also, be aware that programs and manuals will have to be translated into the language you need.

Microcomputers have always been excellent tools for the office, but now that they're portable they will also be excellent tools for the road: as long as you take the proper precautions.

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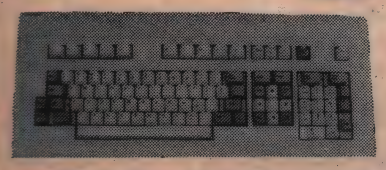

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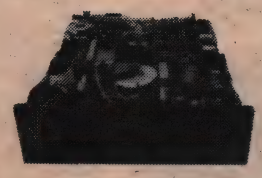

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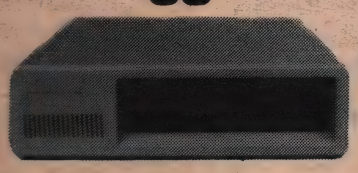

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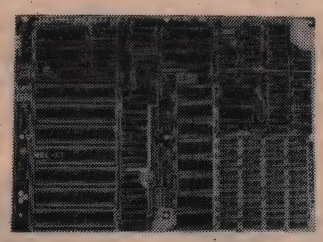

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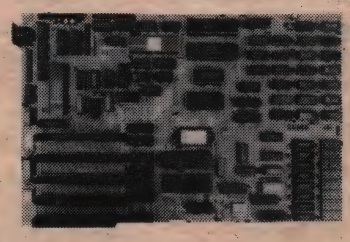

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Portable Roundup continued from page 8

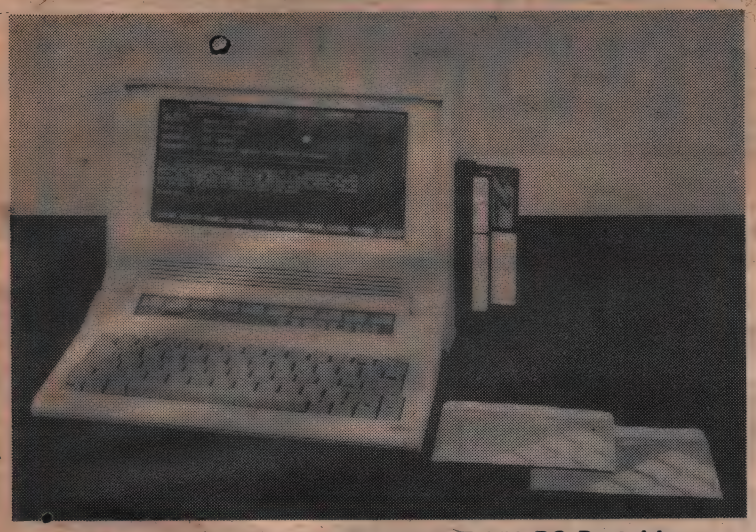

Figure 3 Zenith Data Systems Z-171 PC Portable

63-key keyboard has full 22-key calculator pad overlay. The portable comes complete with the MSDOS 2.11 and 1.25 operating systems at a price of $2,699 for the dual floppy computer. The internal modem is available as an option for $379 and video-out capability for $229 extra. Zenith will market the Z-171 through its national distributors and dealers. Sales and service will be available at more than 750 sites including the 64 U.S. and 9 Canadian Heath/Zenith Computer/Electronic Centers. This wide range of support should prove to be a major factor in the choice of a portable computer for people who travel. While you may have a wonderful dealer who takes excellent care of your equipment, who will service your portable 1,500 miles from home?

serves as the LCD screen with a tilt adjustment, remote contrast control and a low glare lens. The display is 80 columns by 25 lines. The actual display acts like an IBM Color Card with a monochrome monitor. The colors being shown as shades of grey. For graphics the display provides 640 by 200 bit pixels.

The Kaypro 2000 also has a unique detachable keyboard with flip-out feet to adjust the slope angle. This means that the user can tilt and rotate the display for maximum visibility and also position the keyboard for comfort.

Figure 4 Kaypro 2000 Lap Portable

Kaypro 2000 MSDOS-PC Compatible, Lap Computer

Last year Kaypro announced that they would introduce a lap portable manufactured by a major Japanese company. This machine never reached the market under the Kaypro label and its place was taken by a machine of Kaypro's own design manufactured in the United States. The Model 2000 (Fig. 4) is a sleek, well made lap portable that is PC compatible and weighs less that 12 lbs. It has a folding cover that

The mass data storage on the standard Kaypro consists of one 3½" hard shell diskette holding 720K bytes (equivalent to two 360K IBM PC diskettes). Kaypro also supplies (extra cost option) a Disk Adapter, this connector system lets users attach an external 5 ¼" drive or a second 3½" drive. It will even let users connect to the 5¼" drive in an existing PC. The Disk Apapter makes 5¼" disk compatability very inexpensive. As a further measure of expansion, Kaypro also sells a low cost Base Unit that contains a 5 1/4' disk drive as well as two IBM PC compatible expansion slots, an additional serial port and a parallel port are also provided in the Base Unit. The Kaypro 2000 fits neatly on top of the Base Unit and all connections are made automatically, no cables are required. The Base Unit also supports a second floppy disk drive (either 3½" or 5¼"), or a hard disk drive.

The Kaypro 2000 is sold with 256K bytes of RAM and is expandable to 768K bytes internally. Power is either from an AC adapter/charger or from a rechargable battery pack that will power the computer for about four hours. The battery pack is supplied as a standard part of the system rather than as an extra cost item.

The most interesting part of the Kaypro 2000 is its price! The entire 256K computer system costs $1,995. This price includes the Whole Nine Yards! Computer, Disk Drive, 256K RAM, Battery Pack/Charger, Carrying Case, Software. This is the $1,995 computer that *really costs* $1,995. Kaypro is doing to the lap portable business the same thing it did to the Transportable computer sector. It is providing good value at low cost, Made In The USA! The others are quoting low prices and then charging for "options" to boost the price! Since when is an AC adapter/charger an "option" for a portable?

Kaypro 16 MSDOS Computers

Kaypro has extended its portable line into the 16-bit area producing the new line of Kaypro 16 (Fig. 5) machines. These are touted as "Volkswagens of IBM Compatibles" producing a MSDOS portable priced at $3,295 bundled with over $2,000 in software, including Wordstar, Infostar Plus, CalcStar, MITE communications, Mailmerge, Infostar, MSDOS with utilities and GW BASIC. The Kaypro uses the 8088 processor and comes with one 360K floppy and a 10Mbyte hard disk. It boasts 256K RAM and is expandable to 640K. The standard configuration has one 360K floppy and a 10-Mbyte hard disk. This version sells for $3,295 with the software package, truly a fantastic value. For those who do not need the hard disk, there is the Kaypro 16-2 which has two 360K floppies and sells for $2,295 with the software package.

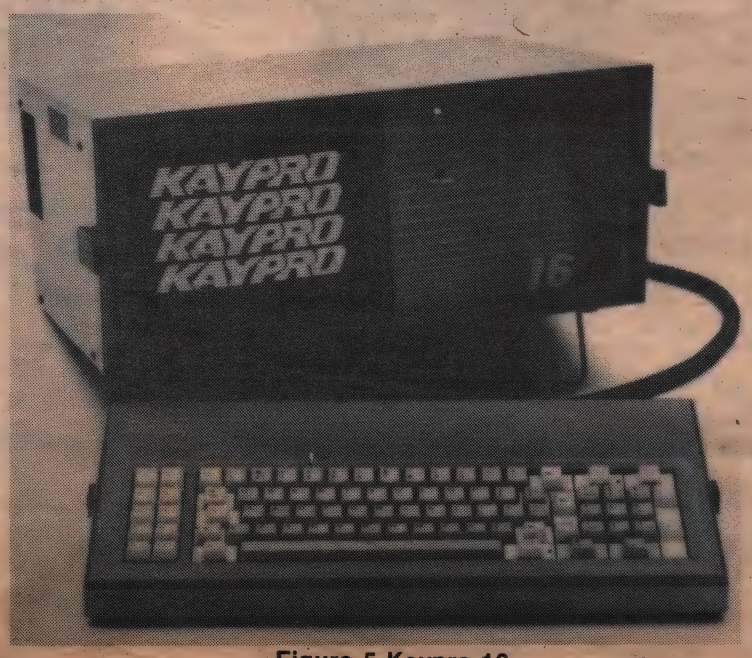

Figure 5 Kaypro 16

An internal, 9-inch, green phosphor, monochrome CRT is built-into the computer, however an external color video monitor (either RGB, or composite) can be connected. The Kaypro is capable of simultaneous monochrome internal video and external color video. The composite video is capable of color only in 40-character mode.

The Kaypro Model 16 is 18-inches wide by 8-inches high and 15 1/2-inches deep. It weighs 35 pounds making it a "transportable" computer. This is a machine you can move from place to place, but you do not want to carry it about by the handle too much!

For information: Kaypro Corp., P.O. Box N, N Del Mar, CA 92014, (619) 481-4300.

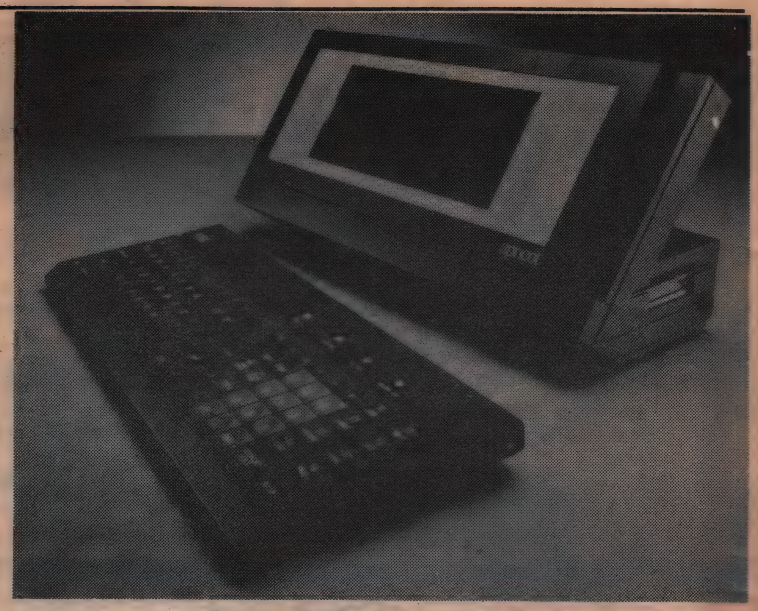

Figure 6 The Apricot Portable

Apricot Portable

This Apricot Portable (see fig. 6) should take the prize for design excellence. It boasts an 80 by 25 LCD flat screen, cordless infrared keyboard, optional infrared cordless mouse, one 3 1/2' disk drive with option of using double sided 720K micro diskettes or single sided 315K bytes. A hard disk option is available.

The memory is 512K bytes of RAM plus 128K bytes of display RAM. There is also 32K of boot ROM. There is a Centronics printer port, an RS232C serial port and an additional communications port capable of operating in either by sync or async modes of operation.

This is an MSDOS 2.11, or CPM/86 computer but it is not necessarily compatible with IBM PC software. It is compatible with desktop Apricot machines for whatever that is worth in the United States. The level of software support seems to run to CP/M-86 or CCP/M-86 programs which do not have much support on this side of the Atlantic. At $2,495 this neat machine will find few takers until Apricot advertises the compatibility table for what is becoming "standard" software.

For information : Apricot Inc., 3375 Scott Blvd Suite 342, Santa Clara, CA 95054, (415) 727-8090

Sanyo 675 Portable

Sanyo has only been producing its popular 775 Portable for a short time and they have already introduced a smaller, lighter model the Sanyo 675 (see fig. 7) which may prove to be their most popular portable computer. The 674 weighs in at 28 lbs. and has a nonglare 7" monochrome (green) CRT. It comes with two 360K floppy disk drives and 256K RAM (expandable to 640K). It is also capable of connecting to an external color monitor with one RGB color interface channel and one composite video channel. It is equipped with a full sized keyboard and has one

Continued on page 187

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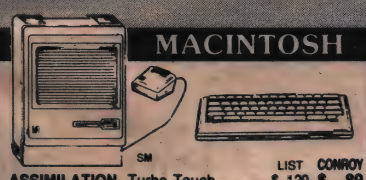

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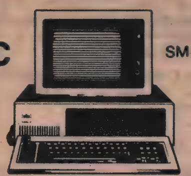

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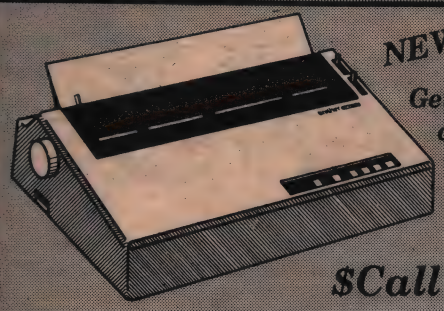

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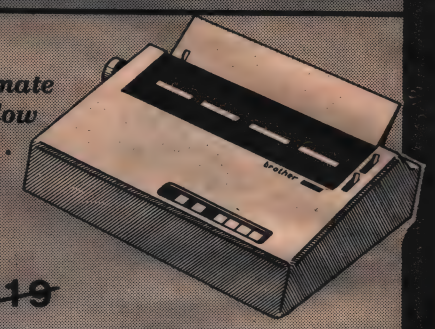

brother HR-10 DAISYWHEEL PRINTER

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The NEW **brother** HR-10 gives you superb quality and advanced technology from the company that has long years of experience in electronic office machines. The HR-10 is not only a high quality unit but a printer that will last with a snappy 120 word per minute print speed. It uses the renowned **brother** cassette daisywheels for ease in changing and the **brother** mess-less ribbon cassettes. And with the text reprinting feature you can set the HR-10 to continuously print out whatever is stored in the 2k memory buffer — all this at the touch of the front panel control. Control codes emulate Diablo 630 codes for universal compatibility with most software. Other standard, time-saving features include super and sub scripting, automatic underlining, and bold printing giving your printout a professional quality cleanliness. The HR-10 is capable of printing most 4 part forms and accepts a paper width up to 11½ inches. This new addition to the **brother** HR series represents an outstanding value for a personal daisywheel printer.

Make your office beautifully efficient with. . .

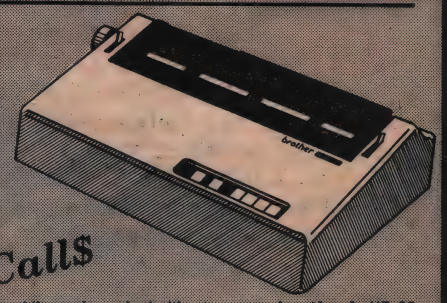
brother HR-25 DAISYWHEEL PRINTER

$Call$ LIST ~~$845~~

brother's HR-25 daisywheel printer has been specially engineered to keep pace with your high volume while producing clean, clear pages of the most beautiful letter quality. Since the HR-25 incorporates a 3k buffer and can print out bi-directionally at a rate of 23 cps, output will never lag behind demand. Once into the buffer, information will be held for repetitive printout with the text reprint function — originals can be produced without end. Previously if you desired to stress certain areas of a text you had to underline the area or type it in uppercase letters. The HR-25's bold type function and red color printout make those stress points literally jump off the page, an especially welcome feature for important reports and letters. Character pitch is selectable among the settings of 10, 12, and 15 positions per inch in addition to proportional spacing. Other features such as super and sub script, auto underlining, carriage skip movement, and easy drop-in ribbon cassettes and daisywheels put the HR-25 ahead of the competition. It is equipped with either a centronics parallel or an RS-232C serial interface and DIP switches conveniently located for easy access, the HR-25 is easily adapted to your computer system. With **brother's** renowned reliability and easy add-on accessories (cut sheet feeder, tractor feed) the HR-25 will increase your office efficiency to unexpected levels.

SAVE UP TO 37% OFF On New Factory Fresh Brother Printers and get a Computer Clock FREE!!!

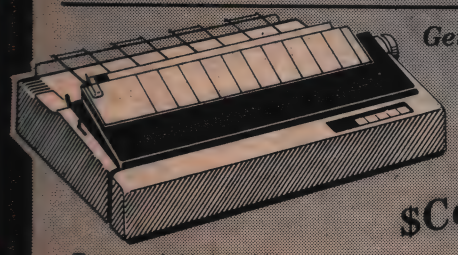
For the high output office get the. . .



brother HR-35 DAISYWHEEL PRINTER

LIST ~~$1245~~ *$Call$*

One of the main concerns in a high output office is putting out the work required without concern. **brother's** HR-35 will not only print out whatever is on your word processor's mind with the finest daisywheel beauty, but will print it out with a speed (32 cps) and accuracy that will keep your work moving in the right direction. Because the HR-35 incorporates a big 7k (23k optional) buffer memory, your computer will be free for other operations almost as soon as you give it the print command. And that buffer won't stay full for long, thanks to HR-35's 32 character per second print speed and bi-directional logic seeking carriage movement. But the HR-35 does not give up efficiency for speed. Since the printer head comes to a full stop at each strike zone, the high quality of the daisy wheel is taken full advantage of. HR-35 presents you with a host of other welcome features such as two color and bold printing, just the thing to make your text stand out. Extras include super and sub script function, auto underlining, proportional spacing, text reprinting, clear buffer and easy to use front panel control for all the main operations. HR-35's back panel allows either centronics parallel or RS-232C serial interface connection. DIP switches are easy to access and attachable options such as the tractor feeder and cut sheet feeder offer increased utility. And it goes without saying that the HR-35 uses exclusive **brother** daisywheel cassettes and ribbon cassette systems for simpler, mess-less changes. **brother** HR-35, a high output printer.



Get the best of both worlds with. . .

brother 2024L PRINTER

(Data and Word Processing)

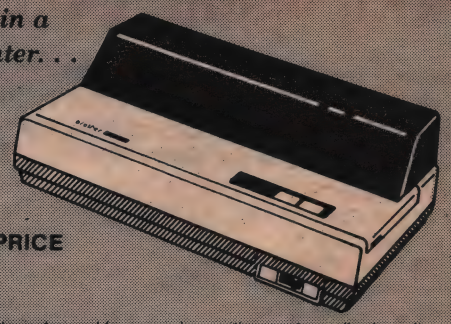
$Call$ LIST ~~$1495~~

The secret behind the 2024L is a unique 24 wire, zig-zag pattern head that produces letter quality print at up to 96 characters per second, while first drafts and other jobs that don't require letter quality are printed at an impressive 160 cps. Paper is supplied to the 2024L smoothly and reliably by the optional cut sheet feeder available at a fraction of the cost of competing models.

Some of the exciting features of the 2024L include. . .

- ★ Improved printing speeds
- ★ Single pass of the print head
- ★ Enlarged characters
- ★ Compact
- ★ Underline
- ★ Shadow printing
- ★ Built-in tractor
- ★ Auto strike-out
- ★ Boldface
- ★ Graphics
- ★ Cut sheet feeder (option)
- ★ Letter quality printouts
- ★ Reduced noise
- ★ Super and subscript

Lower price and versatility in a compact dot matrix printer. . .



NEW brother M-1009

INTRODUCTORY PRICE

$219

The new **brother** M-1009 impact dot matrix printer is designed for personal use with computer applications. It sports crisp characters, bi-directional printing and full Epson compatible graphics. And you'll appreciate it's quiet operation. The M-1009 offers the flexibility to perform your work on plain cut sheet, fanfold, or roll paper. It is tested according to **brother's** own severe standards of quality control to provide you with years of trouble-free service. And with its built-in serial and parallel interfaces the M-1009 is plug compatible with all popular personal computers.

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APPLE IIE DETACHED KEYBOARD

A GEM of a keyboard, in a nice beige ABS case. Lets you build an IBM look-a-like that runs like a IIE with 2 drives in case using our $69.95 case on this page. This KB is fully IIE compatible, with all functions **$149.95**

6502 MOTHER BOARD

$29.95

The famous PARTS GALORE 6502 motherboard that is 100% compatible with upper/lower case, 74LS245 octal buffer (rev-8+), prototype area, and uses EPROMS for all BASIC or boot-to-disc software. (3-2732 or 6-2716 for basic). Still only from us at **$29.95**
UPPER/LOWER Case char. gen. (2716) **$9.95**

ASCII KEYBOARD

Our new ASCII keyboard is the best one we have ever had!!! It uses an 8048 5V only microprocessor packed with features like: AUTOREPEAT, UPPER/LOWER CASE, APPLE® , CPM® and BASIC stored macros(88) that allow single stroke entry of many commands like, "CATALOG" "DIR" "RUN" and so on for 88 of them with complete documentation.
NUMERIC Function Keyboard **$69.95**
STANDARD (Like orig. APPLE) Function Keyboard**$64.95**

KITS KITS KITS FOR 6502 BARE PERIPHERAL CARDS

These kits have all the parts needed for the PCB in question but have no IC's. Please get IC's from BG MICRO or JDR MICRODEVICES as they are reputable, low cost and fast. They advertise in the SHOPPER.

16K Solderable parts kit $13.95
128K Solderable parts kit $18.95
ROM Solderable parts kit $9.95
DISC Solderable parts kit $11.95
DISC 13/16 Solderable parts kit $13.95
DISC Rana Solderable parts kit $24.95
80 Column Solderable parts kit $16.95
80 Col. SS Solderable parts kit $18.95
Z-80 Solderable parts kit $13.95
APPLACARD Solderable parts kit $39.95
Multifunction Solderable parts kit $39.95
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MODEM Solderable parts kit $39.95
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GRAPHICS Dump Printer Solderable parts kit $12.95
SPRITE Solderable parts kit $14.95
SPRITE, Manual, software listing and disc $14.95

NEW EXPANDED 80 COLUMN FOR THE APPLE IIe

This bare PCB allows you to expand your IIe to 128K and get the enhanced 80 column feature in it. It is a real winner and easy to build. We sell it as a bare PCB or wired and tested.

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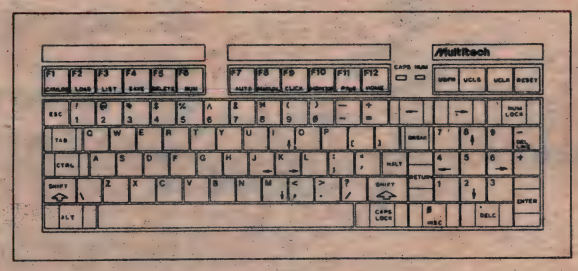
MAK II ACCUFEEL KEYBOARD



This is a detached keyboard in an ABS case with a 6' curly cord to connect it to 6502 based machines. It used a serial data format for error free transmissions down the curly cord with a serial to parallel converter board on the end that is fully 6502/Apple compatible. Has auto repeat, beep, no beep, 10 user programmable macros, 50 preprogrammed macros, auto line number, an dnumeric pad **$149.95**

FRANKLIN COMPATIBLE

APPLE® BARE PC BOARDS PRICE SLASH! NEW LOWER PRICES

16K Memory exp CPM® compatible $9.95
128K Memory exp. Saturn® compatible $12
128K Memory exp. Prometheus® compatible $15
ROM Memory expansion, takes 6 EPROMS $12
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DISC control, 13/16 sector auto select, 2 Dr. $9.95
DISC control, 4 drive RANA4 compatible $9.95
80 column 100% Videx® compatible $9.95
80 column 100% Videx® comp. with softswitch $12
Z-80, the famous CPM® card $9.95
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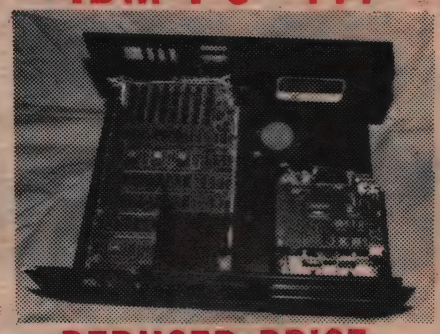
MULTIFUNCTION Card, Mountain compatible $15
RS-232 Serial printer card $9.95
Communications Card, serial dat for modem $9.95
MODEM card, SSM® compatible $14.95
SAM Talking card $9.95
COPYING card, WILDCARD® compatible $9.95
TIME card, TIME II® compatible $9.95
MUSIC Card, 9 voice, G1 chip $9.95
GRAPHIC Dump Printer card, Grappier® comp. $12
SPRITE Graphics card, for TI chip $9.95
PROTOTYPE Large $15
PROTOTYPE Small $12
RGB CARD, has all outputs for TTL RGB monitors $18.95
MAPPING PROM for RGB card $9.95

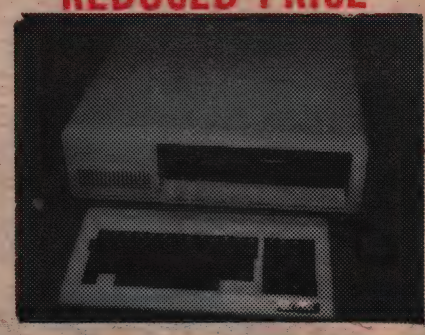
All of these bare PCB's come witha parts list and placement diagram. In some cases you will also need software/firmware to operate these cards. This must be composed or found from a users group, we will not supply it.

The famous APPLE-SEED and APPLE-SEED II are the books that see all, tell all on the various APPLE® clone motherboards and peripherals. They are well worth the $9.95 that we are asking. And KOSMIC has been at it again on IBM® clone motherboards and peripherals and has composed the one and only "BIG BLUE SEED", it goes into greater detail on a smaller number of motherboards and peripherals (over 20 and growing) and will help you to build many of them at a saving.
APPLE-SEED I Motherboard book **$9.95**
APPLE-SEED II Peripheral card book (over 50 cards) **$9.95**
BIG BLUE SEED IBM® peripherals and motherboards (over 20) **$12.95**

IBM PC™ ???



REDUCED PRICE



No, not really, but it is a good look-a-like case for IBM PCB builders or 6502 PCB builders. Both PCB's fit inside and the unit has space for a power supply, fan and 2 std or 4 slimline disc drives. NOW ONLY **$69.95**

HEAVY DUTY POWER SUPPLY $64.95

Our Black Beauty power supply has true specs of 5v at 5 Amp, 12v at 2.5 Amp and −5, −12 at ½ Amp. Each of the +5 or +12 can run at 30% overcurrent for short periods. Has proper sequenced startup and shutdown. Easily runs 2 disc drives and a full set of peripherals.

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14.318 MHZ Xtal .....**$2.49 ea.**
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Character generator .....**$9.95 ea.**
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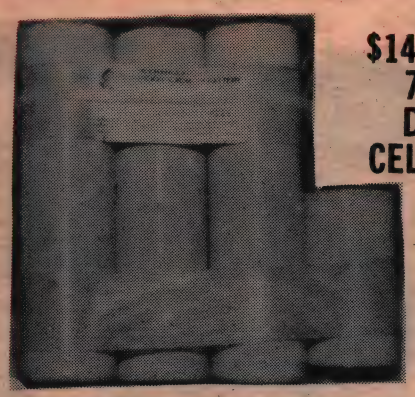

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7
D
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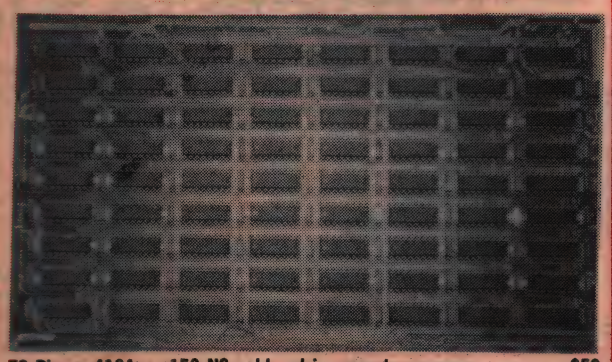
4164 4164 4164 4164 4164
RAMDEAL RAMDEAL RAMDEAL



72 Pieces 4164 — 150 NS soldered in, easy to remove **$50**

ASCII AND MATRIX KEYBOARDS

We just bought a bunch of new surplus keyboards, they are two types. One uses the KR2376 keyboard encoder IC and the other is a matrix type, like the APPLE IIE. Each KB has a full set of keys as pictured and each one has all its constituent parts. We have only a few hundred of each so first come first served. The KR2376 alone is worth what we are asking. Please specify the type you want. They are $9.95 each or three for $20.00, Mix or Match. We regret we have no data on these keyboards.

$9.95 — 3/$20.00

0.1 MONOLITHIC STYLE CAPACITORS

Here is a good value on 0.1 Uf 63V bypass caps. They are as pictured, 0.2" lead spacing with 3/4" long leads. We have 100,000 of them at a very good price. We are selling a bakers dozen for $1.00 = 13 pcs. If you want 100, send us $7.00, 1000 are $60.00.

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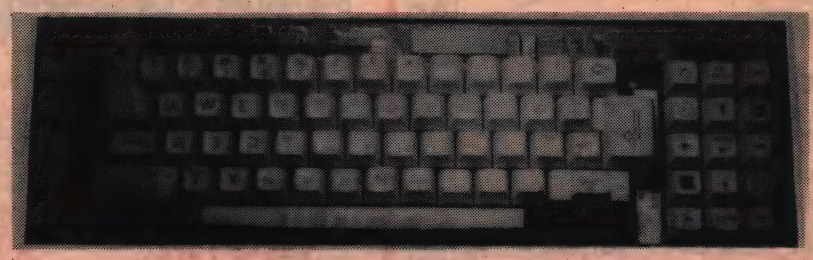
ASCII KEYBOARD

* 8048
* 5V only



* NEW
* Serial
* Parallel
* $19.95

A great deal, this brand new ASCII keyboard came from AES DATA, one of the largest makers of word processors in the world. A novel circuit generates both serial and parallel ASCII out allowing use on both APPLE® and IBM® styles of system. The unit runs on +5V only, has Hall effect keyswitches and uses an 8048 micro for operation. The sculptured keytops are arranged in typewriter style for quick learning and are an attractive light beige in color. We got them for 5% of the $169.00 that AES paid and so we can sell them dirt cheap and still make money. Completely new with 20 pin ribbon IDC connector and pinout for easy interfacing **$19.95**

IC'S

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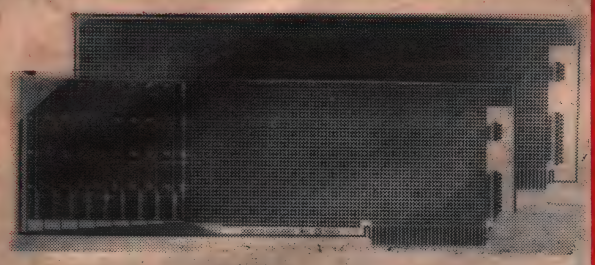
IBM®
BARE PC BOARDS



SIXPACK, A card that works just like the famous "SIXPACK," runs the same software. A great buy for the builder $29.95
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PROM set for above card (2) $24.95
256K CARD, A short card for small people $16.95
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EXTENDER CARD. A 6" extender for easy work and access .$19.95

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SWITCHING POWER SUPPLY

Exact fit to our PC/XT case

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+12V. @ 3.5 AMPS	+12V. @ 4.5 AMPS
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(A) Hinged lid with push button access, comes with plastic front bezel, 8 slot 0.8" (MBE-XT, XT) back panel cut for side switch or back switch power supply (specify) $79.95
(B) MEGABOARD case, hinged lid with plastic front and 7 slot 0.8" back panel, cut for back switch power supply $89.95
(C) ABS plastic version of the (A) above, not as nice as metal but cheaper $64.95
(D) Hinged lid case cut for 6502/IBM machines with front cutouts for keyboard etc $69.95
(E) ABS case for 6502 machines, fits our 6502 motherboard and looks just like Apple©. Has the numeric function keyboard cutout $49.95

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(C) Metal plates for mounting PCB in case $1.50
(Please specify type needed)
(D) Standoffs, 1/4" $.5, 3/8" $.7, 1/2" $.10, 5/8" $.12, 3/4" $.15, 7/8" $.17, 1.0" $.20.

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AN IBM® XT COMPATIBLE 8 SLOT MOTHERBOARD

MBE-XT BARE PCB WITH MANUAL AND SCHEMATICS.
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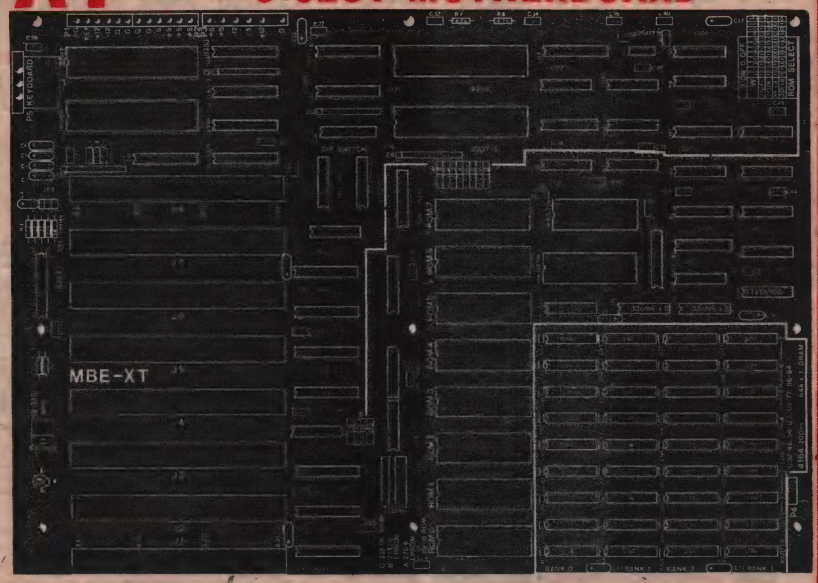

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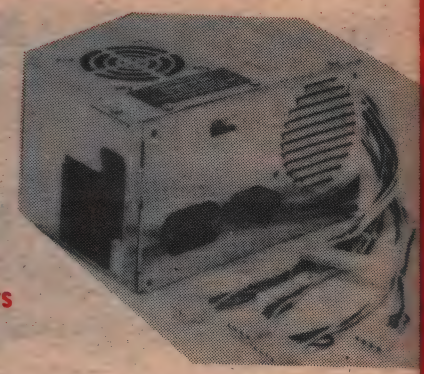
−12V −½A



4 Drive Connectors
$149.95

STEPPERS

(A) A great stepper by Superior, used in printers like Diablo, 15V@0.49A, 7.5°, 36 In Oz, 30 Ohm, Bifilar wound, see picture, lots in stock 3" diam. $6.95
(B) A goody by Phillips, 5V, similar to above $6.95
(C) 24V, 8" Disc drive motor, with 6" worm shaft $6.95
(D) 13V@1.8A, Slo Syn, 15°, 30 In Oz..... $14.95
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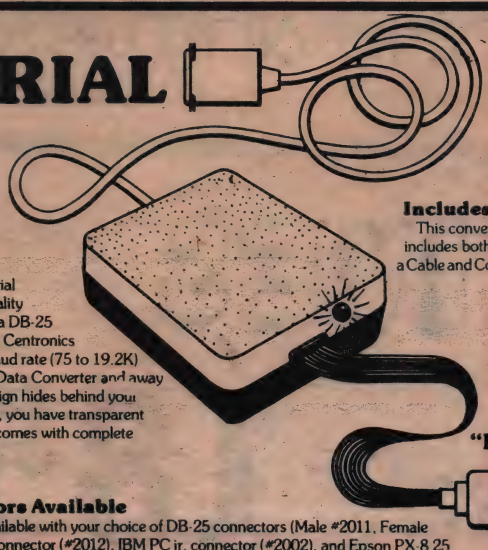
SERIAL PARALLEL DATA CONVERTER



$88.95 (Specify Connector Type) Plus $4.50 Shipping & Handling

Includes 6 Feet of Serial Cable
This converter comes with 6 feet of cable and includes both the Serial and Parallel plugs. Yes, a Cable and Converter for the price of a converter!

Convert Serial to Parallel
Now you can use your serial port for a printer. This quality data converter plugs into a DB-25 pin serial connector and a Centronics Parallel printer. Set the baud rate (75 to 19.2K) on the computer and the Data Converter and away you go. Slim "In-Line" design hides behind your workstation. Once it's set, you have transparent operation. And, this unit comes with complete documentation.

LED Power/Data Indicator
The Data Converter is powered by your parallel printer (Except Epson Printers). Power and data are monitored by a red LED. Users of Epson Printers should purchase an optional power supply (#2015, $7.95) to power the converter.

"RS-232 In, Centronics Parallel Out!"

Custom Connectors Available
The Data Converter is available with your choice of DB-25 connectors (Male #2011, Female #2001), Apple IIc DIN-5 connector (#2012), IBM PC jr. connector (#2002), and Epson PX-8 25 connector (#2013) for the #725 cable. Please specify your selection (# Number) upon ordering.

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KEYBOARD DRAWER STOWS OUT OF SIGHT!

$49.95 (#2810) Plus $4.50 Shipping & Handling

Customize Your Workstation
Now you can purchase a custom drawer designed specifically for your computer keyboard. Pull it out when you login, then stow it protectively away from dust and dirt. Neat, tidy, and professional in appearance.

Slide It Away When Not In Use
Free valuable work space at your computer workstation. The keyboard drawer locks in a fully extended position so the keyboard does not "travel" while in use. And, it can be adjusted to three heights for different users. Once you're done, simply slide it away and out of sight.

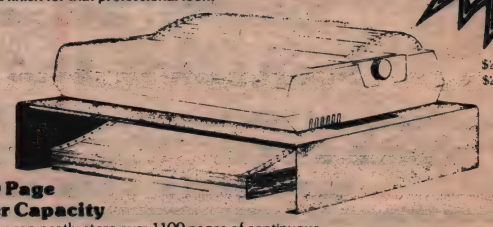
Quality Construction & Smart Design
Built of strong steel and molded plastic, this drawer can work effectively with keyboards measuring 20½" wide x 10" deep x 3¾" high. A smart accessory to add to your crowded workstation. Measure your keyboard and see if this drawer will work for you.

Optional Keyboard Drawer and PC Stand! (not shown)
A Computer Stand elevates your PC and permits the Keyboard Drawer to slide under your system
$75.95 (#2811) plus 8.50 Shipping & Handling

PRINTERS NEED STANDS!

$26.95 $4.50 Shipping & Handling

Handsome Baked Enamel Finish
Strong steel construction and quality design blend with home or office. Each stand is finished in a durable Cream Colored finish for that professional look.



$26.95 (#2910, 5½" x 15" x 13")
$29.95 (#2911, 5½" x 21" x 13")

1100 Page Paper Capacity
Now you can neatly store over 1100 pages of continuous forms in these printer stands. A center slot works with both center feed and rear feed printers while keeping your paper conveniently stored. Cushioned feet protect your desktop and muffle printer operation.

Wide or Narrow Printer Sizes
Choose either the 21" or 15" lengths depending on your printer size. Both models will manage over 1100 pages of continuous forms.

MONITOR PEDESTAL

$25.95 (#2800) Plus $4.50 Shipping & Handling

Reduces Eye/Neck Strain & Screen Glare
Stationary monitors can't adjust to your working posture. This ergonomic accessory allows you to control where the monitor faces and reduces the fatigue associated with long hours at the computer screen. Tilt your screen up or down (up to 25 degrees) and swivel it (360 degrees) as you share some important data. This pedestal makes it easy.

Low Silhouette Design Frees Desk Space
This monitor pedestal incorporates a clean workstation design which increases desk space for each user. Once you have it, you'll wonder how you worked without it.

Tensioning & Locking Controls
Spring tensioning controls allow you to "freeze" your monitor in any position. Attractive Cream Colored exterior conceals controls and contributes to a professional look.

For Small or Large Monitors
Any monitor with a footprint of up to 12" x 12" can be placed on this stand. Rubber no-slip padding prevents monitor skid and protects monitor casing. Strong impact resistant molded plastic will operate trouble free for years to come.

DON'T GET BLOWN OUT!

Professional Quality

Protects SURGE after SURGE
The Brooks Surge Protector is Guaranteed to "Clamp" each and every SURGE. This "Constant Clamping" assures the unit will continue operating after your first Voltage Fluctuation. And, the Surge Protector will respond in 5 *Billionths of a Second* to any new power fluctuation which may be sent down the line.

Protection on ALL Plug Terminals
Some protectors only shield your Hot terminal. The Brooks Surge Protector shields Voltage Fluctuations, and Radio Frequency on *All Three Plug Terminals*. And, the Brooks Surge Protector is designed with an exclusive Surge Protection Monitor Light. "Solderless Connection Engineering" ensures reliable operation and positive plug contact year after year.

$65.95 (#2700, 4 outlets)

$69.95 (#2701, 6 outlets) Plus $4.50 Shipping & Handling

5 Years of Guaranteed Operation.
The manufacturer warrants this unit unconditionally for 5 years from the date of purchase. If anything goes wrong, simply return the unit for repair or replacement at no cost to you.

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6 outlet 39.95 (#2711)

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Stop Plugging & Unplugging
Now you can SHARE your parallel port with TWO PRINTERS! Use your choice of printers on ONE COMPUTER with a simple flick of a switch.

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To install, connect any standard Centronics Parallel Cable directly to the switch, and connect the switch cables to each printer. The Printer Switch will redirect four signal connections to your chosen device. You can even use your existing cable so, no extra cables may be required.

Compact Design, Quality Construction.
Small (5¾" x 3¾" x 1⅛") heavy duty enclosure fits any workstation or even wall mounts. This switch is U.L. Approved and thoroughly tested by the manufacturer.

One Year Warranty
Designed to operate faithfully for years and warranted against defects for one year.

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Single Sided Drive
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INCLUDES: Enclosure, Fan, Power Supply, and Above Drives

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SINGLE SIDED	$395.00	SINGLE SIDED	$595.00
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According to leading publications, the PC market is in the midst of a fullblown shakeout. IBM, KAYPRO, OSBORNE and most other PC manufacturers are initiating cutbacks and layoffs due to slumping sales. Their increasing advertising dollar brings less & less results. At the same time sales for the ZORBA portable computer, the computer that is only advertised in a few choice periodicals and relies heavily on satisfied user testimonials, are showing a steady increase.

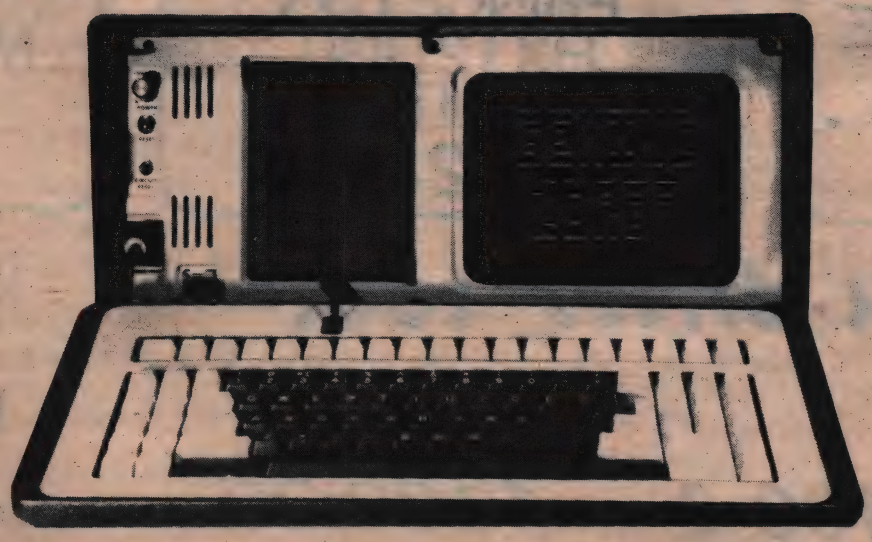
It's no secret, the public is learning what industrial users have known for years. That is: that for daily operation of word-processors, spreadsheets and databases, the trendy options are rarely used and the flashy machines that house them are really no faster, no more reliable and much more expensive.

THE PUBLICS LEARNING WHY THE ZORBA IS STILL AND ALWAYS HAS BEEN THE EXPERTS CHOICE.

ZORBA
PORTABLE COMPUTER

FEATURES:

- 9" GREEN OR AMBER CRT
- 19 INDEPENDENT, 55 PROGRAM-ABLE FUNCTION KEYS
- TWO 400K DSDD DRIVES
- 64K BYTES 150 NS RAM
- C BASIC COMPILER
- IEEE 488 BUS MASTER PORT
- 24.6 LBS
- CPM 2.2 OPERATING SYSTEM
- M80 (L80, LIB80, CREF80)
- SOURCE CODE OF THE BIOS PLUS UTILITIES
- DATA COMMUNICATIONS SETUP PACKAGE
- SERIAL & PARALLEL PRINTER PORT
- DATA COMMUNICATION PORT



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OPTIONS:

- 16 BIT 256K RAM UPGRADE (8088 CPU) $600.00
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General Specifications

ZORBA is the lowest cost full featured portable computer. This light weight computer is ruggedly packaged in a convenient carrying case. The case surrounds a strong inner chassis which further protects the Z80A based computer with its two double sided double density disk 400K drives, large easy to read 9" display screen and well designed detachable keyboard.

ZORBA uses CP/M, the industry standard operatin[illegible]stem, which means that a wide r[illegible]xisting software is readily availa[illegible] user.

The ZORBA users manual covers operation of the unit, all supplied software and all interface and internal information. A system diskette is supplied with all system files and utilities. A second diskette contains the sources for all ZORBA software including BIOS, SETUP, FORMAT, and PATCH.

Keyboard

Keyboard communicates serially with CPU
Detachable with 2 foot coiled cord
95 keys in standard QWERTY format
13 Key Numeric pad
Independent Caps Lock and Shift Lock
55 Software programmable function keys
All keys auto-repeat after 1 second delay
All Standard cursor and terminal control keys

Disk System

Controller:	WD1793
Drives:	5.25 Double Sided, Double Density, 400K 48 TPI

Built-in disk interchange formats: Xerox 820 (SD, DD), Kaycomp (DD), DEC VT-180 (SD), Osborne (SD) and IBM-PC (eg. CPM/86) and Televideo 802 (Read/Write and Format compatibility) (Expandable to 82 Formats)

Specifications
General Mechanical and Electrical

Width	-17.5 inches (44.45 cm)
Height	- 9.0 inches (22.86 cm)
Depth	-16.0 inches (40.64 cm)
Weight	-24.6 pounds (11.1 Kg)
Power	-80-130 VAC or 190-245 VAC 50/60 Hz 170 watts max

Display

Display Tube:
9" diagonal, Green or Amber
High resolution display circuitry
60 Hz refresh rate

Display Format:
25 lines x 80 columns
5x7 Character Font with full descenders
128 ASCII Characters
8x9 32 Characters Graphic Font
2K Memory Mapped Display Buffer

CPU Board

Z80A CPU running at 4 Mhz with no wait states
64K bytes of 150 ns RAM (58K after CP/M loaded)
16K bytes of EPROM (2732) can be switched in and out by software 12K available for user EPROMS
8275 CRT controller, DMA driven
1793 Floppy disk controller, SMC data separator
Bipolar proms configure 10 addresses
Fully structured interrupts prioritized by bipolar proms

Interfaces

- Full asynchronous RS232 port with modem control. Baud rates and data translation and protocol programmable
- Full asynchronous full duplex RS232 port with hardware handshake (for printers). Baud rates and protocol programmable. (Serial Printer Port)
- One 8 Bit parallel port with independent strobe and ready lines. Supports Centronics interface with an available adaptor cable.
- IEEE 488 Bus Master Port (ie: General Purpose Instrumentation Bus) not Software Supported.
- 21 Standard Software Programmable Baud Rates: 45.5 to 19,200 BPS

CP/M 2.2, C BASIC, CP/M 86 ARE REGISTERED TRADEMARKS OF DIGITAL RESEARCH, INC. ACCESS, IBM-PC, KAYPRO, MAX 80, MORROW, NEC PC, OSBORNE, SUPERBRAIN, SYSTELO/OLYMPIA, DEC VT-180, XEROX, ZENITH, AVATAR, CASIO, COLUMBIA, EPSON, HP-125/87, OTRONA, PMC, SANYO, TELEVIDEO, ALTOS, EAGLE II, FOX, MONROE, DEC, RAINBOW TECH, INT, CORP, MACRO-80, LINK-80, CREF-80, and LIB-80 ARE REGISTERED TRADEMARKS

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FX100+	499

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93 IBM	575
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64K RAM CHIPS

9 for $13

100	500	1000
.95 each	.85 each	.80 each

256 K CHIPS

$7 each

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SMART MODEM 1200	$399
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HOME RECORD MANAGEMENT SYSTEM
Sorts expenses for tax purposes, performs automated bank reconciliations and more!

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Prices and Availability Subject To Change Without Notice

"The Greywolf Super System: A Truly Excellent Upgrade"
April, 1985 Soft Sector Review

$1099

Super Features:

1. Twin 1 megabyte drives -- 811K each formatted. Up to 450 pages of text.
2. Hardware switch enables drives to boot 360K software. The Greywolf Super System is the **only** upgrade which can **fully** use the Sanyo Video Ram (Lotus) board.
3. The Super System has the ability to configure its disk drives to accommodate the formats of many different MS-DOS computers, including the IBM-PC and compatibles, the DEC Rainbow, the Tandy Model 2000 and many more. The Super System can read 48 and 96 track per inch diskettes, it can read single and double sided diskettes, and it can read 8, 9 or 10 sector per track diskettes. A powerful and unique feature of the Super System is the "identify" utility. With it, the Super System can examine a disk of an unknown machine, identify the disk configuration, and tell the operator how to read, write and format that diskette.
4. Full 256K of RAM installed and tested allowing lightning fast operation with the RAM disk.
5. Customer Support: We help our customers get the most from their computers.

Software Included with the Greywolf Super System:

WordStar
EasyWriter I
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All Infostar packages
RAM Disk
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Games and Utilities Collection
Datastar
Reportstar

Super System Upgrade Kit for Sanyo Owners

Includes 2 Teac 811K disk drives, the Greywolf I/O System for both MS-DOS 2.11 and MS-DOS 1.25. Includes the original MS-DOS 2.11 plus utilities plus the RAM disk, Screen dump, Calendar program, games and utilities. Full documentation and installation instructions included.

Complete for $299.00.

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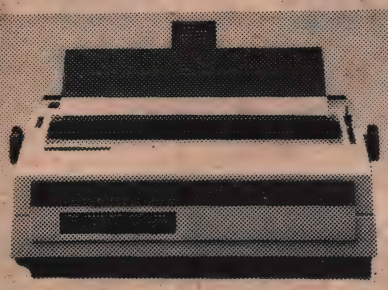

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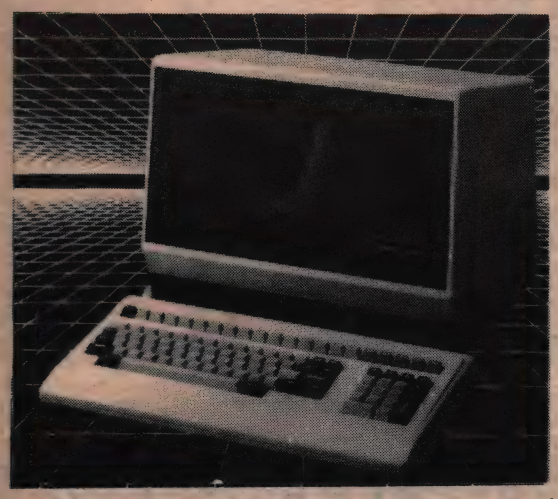

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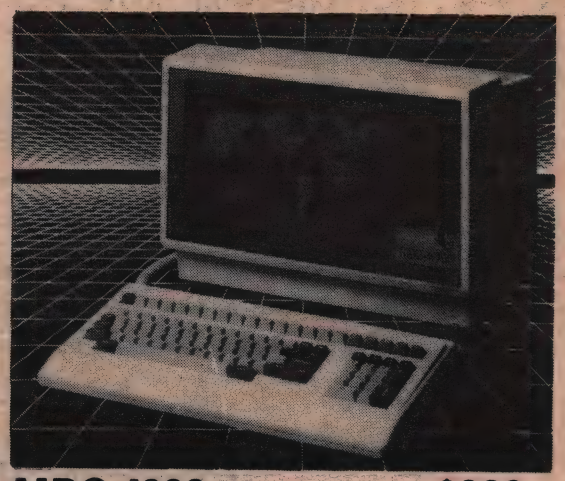

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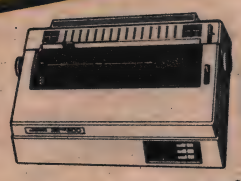

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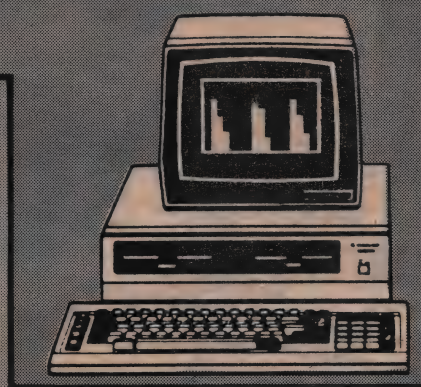

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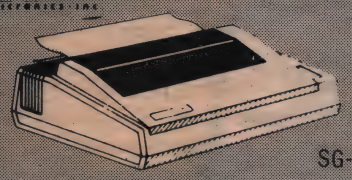

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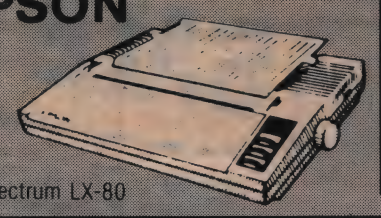

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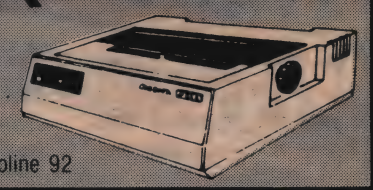

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DoubleDos

A Review
by Andrew M. Fried

You have a one hundred and fifty page document you must print out in time to make the Federal Express pickup today at four o'clock. It is now two o'clock and it will take your PC and its printer every bit of two hours to print the document. But wait! You just remembered that you need to jump up on MCI Mail and retrieve a twenty page proposal and proof-it before three! One lowly PC sits on the desk with a Hayes 300 baud modem. What to do???

If your reaction was to reach for the aspirin, you'd be wrong. DoubleDos, a software package which enables your PC to do multi-tasking would probably have saved the day. Using DoubleDos, you can run your word processor and have it print the document while you are using your terminal communications program to dump the MCI Mail letter to your disk for inspection. Running both programs at the same time, you are able to complete both tasks in the time it would normally take for one. But how is it done?

Concurrency

To begin with, the IBM PC has only one central processing unit (or CPU). This means that it is incapable of running two separate programs simultaneously. While this may sound like a contradiction to what I said above, it actually isn't. You see, in order to run two programs at the same time, DoubleDos does a little magic, so to speak. It actually partitions your memory into two distinct sections which it refers to as the top memory section and the bottom memory section.

Each of these memory sections will accept one program, enabling up to two different programs to be resident in memory at one time. Once loaded, DoubleDos then handles each area on a time-shared basis. A given number of instruction cycles are performed on the top memory area, then several are performed on the bottom memory section. The final result is that the computer gives the appearance of concurrency while it is actually doing little more than alternating between the two applications.

Installing DoubleDos

DoubleDos is installed in much the same way DOS is installed - through the use of a file similiar to CONFIG.SYS. Using Edlin, a word processor, or DOS, you must create a file called DDCONFIG.SYS which contains several options you wish installed in DoubleDos. When DoubleDos is first called, it looks for this file and, if found, uses the parameters passed to it when becoming resident in memory. If DDCONFIG.SYS is not found, certain default values are used.

The first assignment is for that of memory size. As already mentioned, DoubleDos causes your memory to be partitioned into two separate and distinct areas; one for each application. If you do not specify any size, one partition will be created using 128K and the other will contain the all other available memory. With this option, you may specify the size of each partition or may make them equal by specifying each to take up half of the available memory.

The second assignment concerns the type of video display you are using. DoubleDos can determine what type of equipment you have (color graphics or monochrome card) as long as it is IBM equipment. Other types of equipment may give erroneous information to DOS causing problems for DoubleDos. Furthermore, if you have two video adapters (one color and one monochrome), DoubleDos can be told to make both partitions, the top and the bottom, both visible on the screen simultaneously.

You may, through the configuration file, select different types of menus, assign alternate menu keys (key used to switch from one task to another), and select a program to automatically be loaded and run in one of the partitions when first booted up.

Loading DoubleDos

Readers of my articles know how I feel about copy protected software. It is a shame that SoftLogic decided to do this, but the DoubleDos distribution diskette employs copy protection. This means that instead of installing it once on your hard disk and forgetting about it, you are forced to boot up using the original diskette on your floppy disk drive.

DoubleDos Control

Once DoubleDos is resident, you are then able to select which partition you wish to operate out of. If you are using the default settings of DoubleDos, entering the CTL-ALT-DEL sequence will place you into the DoubleDos menu. I certainly suggest that you are quite certain that DoubleDos is resident before entering the sequence of characters or else you'll reboot your system (and possibly loose important data)! I personally feel this was a foolish way of jumping into the main menu because of the potential to inadvertently use that command at the wrong time!

You do have the ability to change the CTL-ALT-DEL command by specifying an alternative to the delete key. This is accomplished by using your DDCONFIG.SYS file just discussed. You may assign any other key (except the shift key) for use with CTL-ALT command. If you changed the character to the space bar, you would then enter CTL-ALT-SPACE in order to access the menu.

DoubleDos Partitions

When you load two application programs under DoubleDos, one will become the "visible" program and the other the "invisible" one. This means that the visible program will be able to receive input from the keyboard and write data to the screen. The invisible program, on the other hand, will be able to run in the background but cannot receive any input from the operator. If you were trying to print out a document using your word processor, it could easily be accomplished while the program was invisible (or in the background). If you were editing a document, however, you would only be able to do so if the program was in the foreground, or visible.

Reversing the programs is a simple task. When you enter the CTL-ALT-DEL, you are presented with a menu whose first choice is to reverse the file status. This causes the invisible file to become visible and the visible file to become invisible.

There are two other options in the menu which allow you to stop program execution and allow you to exit DoubleDos and reboot the system. Freezing program execution is particularly useful when you encounter screen related problems as a result of the "invisible" program. An explanation is necessary.

A Lesson in DOS

While the IBM PC and compatibles have two very different video display adapters (graphics and monochrome),

Continued on page 70

"Windshields of the Future"

Windows and Multitasking Framework, Top View, and Others

by Hal Nieburg

"Windowing" is now the rage, and indeed, it represents the wave of present. From Sidekick to Top View, 1985 will be the Year of the Window! Any software that does not offer some windowing capability will be old fashioned.

The implications of windowing go well beyond pretty, well-designed multiple screens and integrated functional packages.

The ultimate implications are concurrency and multitasking; simultaneous execution and processing of programs and data in different parts of memory. And beyond that it means unlimited networking of multiple multiuser/multitasking systems to the far reaches of the imagination.

The software that best exemplifies the trend is probably Aston-Tate's Framework. Named "Product of the Year" for 1984 by **PC Week**, FW has wowed virtually all the reviewers like no other software in recent years. It is the first integrated package (spreadsheet, database, outlining, communications, word processing, graphing, and a powerful program language) to actually achieve the purposes of integration, a single concept and set of commands for all uses, seamless and smoother intersection of all parts, and consistency of quality across its whole range of operations.

Unlike Symphony, Open Access, and other attempts at integration, Framework is not a creaking patchwork of programs ingeniously linked together, but rather, a single program with multiple applications, based on a central theme. It is correctly named because that central theme is "frames," boxes on the screen. More important, it represents actual partitioning of RAM among program elements, making possible the simultaneous processing of different functions while writing them directly to separate windows on the screen.

The implications go beyond mere screen presentation. Framework points the way to the future, and every programmer is following with all deliberate speed. As dynamic RAM gets cheaper and as new CPUs, faster than ever and capable of addressing vast expanses of memory, come off the production lines, the borderlines now dividing micros, minis, and mainframes will evaporate. The desktop micro, costing a few thousand, will emulate the functions of multi-million dollar systems. The implications are large and portentious.

For one thing, the technological rush will continue to make obsolete systems

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IBM Color Jetprinter

IBM Introduces Two Personal Computer Printers With Near Letter Quality

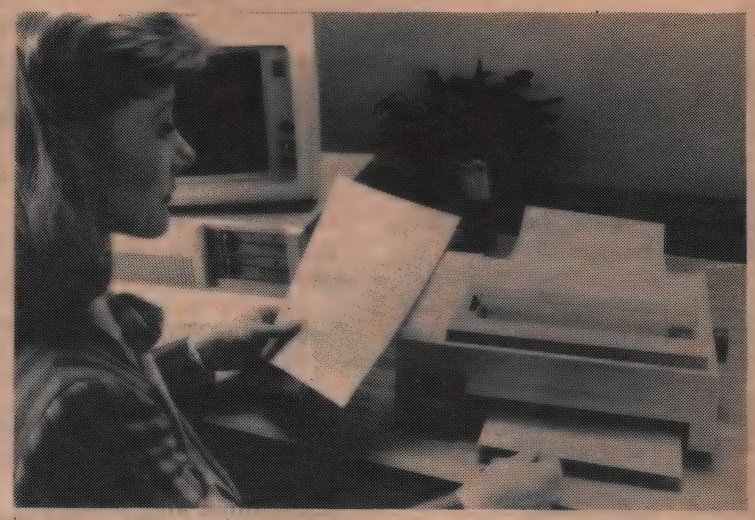
IBM announced two low-cost, desktop printers that produce graphics and near letter-quality text for personal computers.

The $549 IBM Proprinter, which prints at three speeds, is designed for office or home use. An open slot in the front of the dot-matrix unit can be used to feed single-sheet paper, multi-part forms or envelopes. Continuous-form paper, fed from the top, can be used for high speed drafts or long reports and left in place while letters and envelopes, for example, are inserted in front.

The $745 IBM Color Jetprinter is designed for business professionals who want to incorporate up to seven colors into charts, graphs, spreadsheets or high-quality text.

The Proprinter will attach to the entire IBM Personal Computer family and other leading home and office personal computers. The Color Jetprinter also attaches to the IBM PC family as well as IBM-compatible PCs.

A one-year warranty on parts and service comes with the two new printers.



IBM Proprinter

Versatile Printers

The new Proprinter can print drafts or high volumes of data at up to 200 characters

Continued on page 74

Low Cost GPIB Interface For The IBM PC/Compatibles

Real Time Devices has introduced the GP100, the lowest cost GPIB interface available for the IBM PC and compatibles. At $299.00 (single quantity) the system utilizes an interface based on the TMS9914A GPIB controller chip, and includes a high speed assembly language interface to BASIC with over 40 commands. An extensive tutorial/reference manual accompanies each GP100 which contains an overview of the GPIB and detailed installation instructions. In single quantity prices, the GP100 is $100.00 to $150.00 below the price of comparable interfaces.

"We are very pleased to break the $300.00 price barrier in mating the popular IBM bus with the powerful GPIB," says Daniel Szybist, President of Real Time Devices. "Existing GPIB implementations suffer from being difficult to use and are too expensive. Our approach has been to design an easy-to-use software package without compromising flexibility. For the GPIB's potential to be fully realized, the price must come down - and that is what we have done." Supporting up to 15 devices, the GP100 brings the cost per channel to under $20.00.

Applications for the GP100 include industrial automation,

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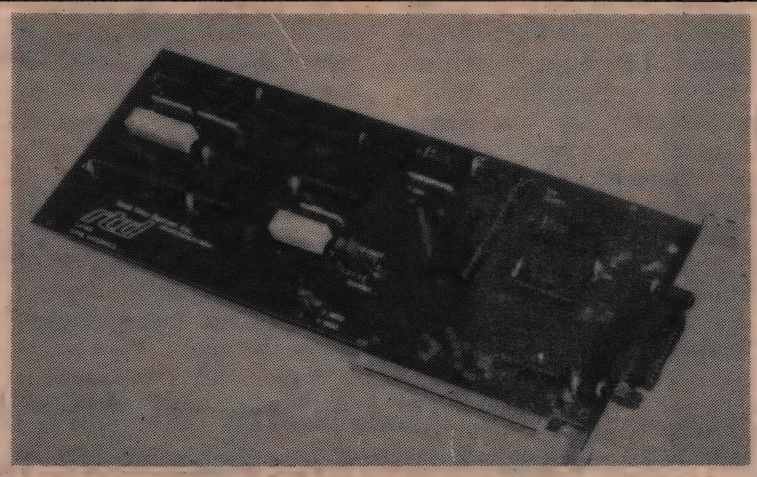

GP100 GPIB Interface Board

IQ Technologies Introduces New IBM PCjr Smart Cable

IQ Technologies announces a solution to the IBM PCjr printer cable problem. The new Model SC807 Smart Cable eliminates the need for both a custom cable and a 16-to-25-pin adapter by connecting the IBM PCjr to a printer, plotter or modem with a single cable.

The SC807 Smart Cable converts the PCjr's 16-pin connector to a standard 25-pin serial connector and completes the RS-232 interface. Most peripherals have 25-pin connectors, so to connect the 16-pin PCjr, both a special adapter and a custom cable are required. The new SC807 completes the connection with one cable, simply and inexpen-

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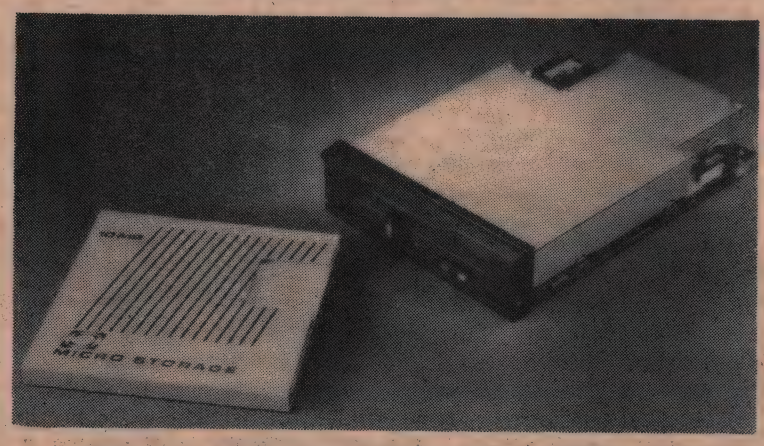
Micro Storage Corporation Announces 10 Megabyte Removable Cartridge Disk Drive For IBM PC

A 5.25-inch removable media rigid disk drive for the personal and microcomputer markets which combines the speed, high capacity and reliability of sealed Winchester drives with the portability and convenience of floppy disk systems was announced by Micro Storage Corporation.

"Micro Storage's rigid cartridge disk drives enable users to easily expand, backup, remove, carry, ship or mail their application data anywhere," said Hiroshi Shishido, president of Micro Storage.

The company's first product, the MS212, is a low cost, 5.25-inch, half-high cartridge disk drive with 10-megabytes of formatted storage. Carbon-coated thin file sputtered media is used for the cartridges to insure durability and to reduce susceptibility to contaminant failures. An on-board microprocessor in the drive electronics boosts performance by speeding data access time. The half-high 5.25-inch drive has standard dimensions, loads from the front, and utilizes a standard ST506/412 interface. In addition, the MS212 can be mounted horizontally or vertically.



Micro Storage 10 Mbyte Removable Cartridge Drive

"Cartridge drives provide a new medium for personal storage in the rapidly growing microprocessor hard disk market. In addition to providing users with greater security over primary data, cartridge disk drives can be used to backup other drives; they can be stored or shipped as easily as floppies but are more reliable and hold up to 30 times more data," said Shishido.

Micro Storage Corporation designs, manufacturers and markets removable cartridge disk drives for the systems and subsystems' OEM marketplace. Founded in March, 1984, the company is headquartered in Santa Clara, CA.

For additional information, contact: Ed North, Micro Storage Corporation, 2986 Oakmead Village Court, Santa Clara, CA, 95051 (408)-986-0770.

Mention that you read it in the **Computer Shopper.** ●

APPLE II

Ask The Guru

by Don Lancaster

All about microjustification and proportional spacing; inside information on Applesloth, DOS, ProDOS and Applewriter; secrets of shuffling; upgrading a II + to a IIe, and the secrets of disassembly aliasing.

Zounds. We're up to Release 7.0.

I could use your help on something. If someone calls with an Apple question or a 6502 machine language question, I can either immediately help or else usually know where to send them to get an answer.

But not so with all those CP/M, Compac, Commodore 64, Timex, Kaypro, Rat's Mouth Zero, Atari, Heath, et al problems. Could some of you out there clue me in to the best user groups, specialty magazines that are actually used and read, help lines, bulletin boards, or other "generic" places to get effective answers to stock and common problems on these machines?

One clarification from last month. The IIe upgrade will handle inverse uppercase on old programs without hassles, provided that the older program uses the stock $FDF0 "Fideyfoo" or $FDED monitor entry points and if the 80 column firmware is active, and if the mouse nest is switched off.

Unfortunately, many, if not most, of the popular and higher quality older Apple programs use their own display routines, particularly for direct pokes of inverse characters directly to the screen. Naturally, the programs you are most likely to use (such as older Applewriter and Visicalc) are the ones that have the most hassles with the upgrade.

The best and cheapest solution remains the character generator switcher shown you last month. Unless you want to buy all new software or install bunches of patches. As a reminder, I have free "detrashing" patches available for Applewriter IIe. These work on either the IIc or the new IIe. Just ask.

I was a bit late getting last month's column in, so the names and addresses got left off. Sorry about that. You'll find them added to the end of this column instead.

On to some utter ignomity. The shame and horror of it all.

SAMS tells me we still have over 17 copies of **Enhancing your Apple II, volume II** (#22415) left. It severely hurts an author's credibility and reputation if a book does not sell out its first printing within ten days of its release.

Now, I hate to get nasty, but if certain of you don't shape up by next month, I will be forced to publish the names of the remaining seventeen **Computer Shopper** readers who have not yet seen the way, the truth, and the light.

This, of course, will exclude you from ever getting invited on a tinaja quest.

Oh well.

As usual, be sure to keep the post office hacked off and the phone lines jammed up. Use the number and address at the end to get in on the fun.

On to Release 7.0...

What Is The Difference Between Proportional Spacing And Microjustification?

There is a lot of misinformation on these two terms, made worse by printer manufacturers and by word processing software that cuts corners or claim they can do what they cannot.

Figure one shows us some print samples that should clear things up for us.

Proportional spacing simply means that a "W" prints wider on the page than an "i" does. Nothing more. The opposite of proportional spacing is called **fixed pitch.** Most older typewriters offer fixed pitch, where the spacing between characters is always the same. Most typesetting uses proportional spacing, since it is visually pleasant and easier to read.

Many medium quality printers support proportional spacing. On a daisywheel, this takes a special wheel and special settings. One popular proportional spaced **Diablo** daisywheel is the **BOLD PS.** Sometimes a stock firmware table is built into the printer to look up how far to move after each character. Other times, a table can be downloaded for custom wheels. Some dot matrix printers also support proportional fonts that are activated by custom software routines.

If your word processor will let you imbed special commands for your printer, then you can easily do proportional spacing with it. **Applewriter** lets you do proportional spacing on any printer that also has the ability to proportional space. Routes to imbedding commands include [V]erbatium entry, a glossary, or a WPL routine. **Wordstar** also provides for proportional spacing. Many lesser word processing programs will not.

The way to find out is to look at the list of commands for your printer to see if there is a "Proportional ON" and "Proportional OFF" command on the command list. Then see if your word processor lets you imbed escape or other control commands directly into your textfiles.

Note that proportional spacing only affects how far you move to get to the immediately next character, and nothing more.

In general, **justification** is the arrangement of a line of letters on the page. With left justification, center justification, or right justification, the characters are placed closely together and then aligned so they sit at the left margin, are centered, or end flush at the right margin. Left, center, or right justification may be done either in fixed pitch or proportional spacing.

The one everyone wants is **fill justification.** With fill justification, the characters are stretched out as much as needed to create a flush left and flush right margin. Just like you see here in **Computer Shopper.** Traditionally, justification was done on a linotype machine by forcing wedges up between the character molds to stretch them out as needed for a cast type line.

The most common microcomputer fill justification is called **whole space** justification. With whole space justification, you double or triple each space between words until the line is stretched out across the page. The type of justification can even be done on a plain old typewriter if you are patient enough. All but the crudest or the very best of word processors support whole space justification.

The trouble with whole space justification is that it looks awkward and spacey. You can also get a **shading effect** across the printed text if the program always starts from the left or right side, or a "toothless grin" effect if it starts

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Figure One - SOME PRINT EXAMPLES

This is an example of a fixed pitch font which is left justified only. Note the ragged right margin. Note also that the spacing between characters is constant, making a "W" the same width as an "i".

This is an example of a fixed pitch font that uses a "by spaces" fill justify. Extra spaces are added when and as they are needed to force both the left and the right margins to "straight lines".

This is an example of a proportionally spaced font that is left justified only. Note how the width of a "W" and an "i" are different. Note also that this font is both more visually attractive and crams more letters in a smaller space than does fixed pitch.

And this is what we are really after, a proportional font that is also microjustified. Microjustification is done by microstretching all of the spaces uniformly. If that is not enough, then the spacing between individual letters is also microspaced.

Figure Two -- Microjustification Commands

```
IMAGEWRITER:

 [esc] S n    - will add "n" dot spaces after
                each letter that follows.

DIABLO 630:

 [esc] M      - will automatically do a full
                microjustify, working with a
                previously set right margin.

 [esc] [Q] n  - will add "n" dot spaces after
                each letter that follows.

FAKE DIABLOS:

 [esc] [_] n  - will add "n" dot spaces
                between character centers.
                You must seperately calculate
                each proportional character.

LASERWRITER:

 ASHOW        - stretch space between all
                characters by next value.

 WIDTHSHOW    - stretch only spaces by the
                next value.

 AWIDTHSHOW   - stretch or compress an line
                that is already justified.
```

The IIc Becomes Truly Portable

by Philip Chien

When Apple Computer first announced the Apple IIc last year, the industry was impressed. While IBM was touting their portable PC, and Tandy was marketing the Model 4P, Apple was introducing a truly portable machine - almost. Although an Apple IIc weighs under 4 kilos (10 pounds), that weight doesn't include the power supply or monitor needed.

Third party manufacturers have released various power packs for the IIc. They include everything from simple nicad battery packs to full portable work stations with built-in batteries and storage space for diskettes and manuals. Unfortunately, the problem with the display has remained. A IIc monitor weighs 16 pounds with its stand, hardly practical for a portable computer. One manufacturer has released a 2" diagonal monitor for use with the IIc, but the display is rather difficult to read.

This year (finally) Apple started shipping the long awaited LC (Liquid Crystal) screen. Originally scheduled to be released last September, the screen was well worth the wait. It weighs 1.1 kilos (2.5 pounds), and attaches directly to the special video port on the back of the IIc. It measures 13.8 cm x 29 cm x 4 cm (5.4 x 11.4 x 1.6 inches), and will even fit into the IIc's carrying case.

The unit is a full 80 column by 24 line (560x192 dots) display instead of the 8 or 16 line by 40 column display used in other portable computers. Power is supplied directly from the IIc, and a two drive IIc setup with a battery pack and LC screen will run several hours on a single battery charge. The screen attaches to the IIc's special video port, but the normal RCA video jack is still available (if you need to attach another monitor or video display at the same time). Naturally, you can't use an RGB monitor or IIc R-F modulator at the same time, because they attach to the same video port the LC screen uses.

LC displays are not direct replacements for CRTs (Cathode Ray Tubes, the working end of a monitor or television set). A CRT's screen consists of phosphors, little dots which glow when hit by electrons. An LC display is normally clear but turns opaque when electricity is passed through. A reflective background shows up as a light grey, where the opaque portions of the display turn up as black. Since the phosphors give their own light, CRTs can be used in a totally dark room but require a lot of power (for the electron guns and for the magnets which aim the guns), and a fairly large case (to support the CRT's vacuum tube). An LC display can be as small and light as needed, and uses very little power to activate the liquid crystal dots, but needs a fairly large amount of room light to make the display readable. Since the LC display works by reflecting light, placement of the screen, light, and user is critical. The screen must be positioned very carefully, and only one user can use the computer at a time. Since monitors are based on 50 year old technology, and LC displays are less than a decade old, LC displays are very expensive, and usually very small, (e.g. watches, one line displays, etc.), but prices are dropping, and screens are getting larger.

Early LC displays have major problems with contrast level (limited by the reflectivity of the back panel, and the transparency of the crystals), and refresh rate (limited by the speed the crystals change from transparent to opaque and back). A CRT has no problem keeping up with a computer's 60 hz screen refresh rate, but an LC screen can "ghost". (One of the reasons LC displays are normally used with slow moving, low change displays like digital watches and thermometers.) Both problems have been reduced drastically but still exist to a degree in all LC displays.

The contrast level of the IIc LC screen is very good, much better than other portable LC displays. An inverse switch lets you select black characters on a grey background, or grey characters on a black background. The black on grey mode is more suitable for text oriented displays, but if you use any graphic programs, then the grey on black mode is closer to a monitor's display. The Apple LC Screen has a better refresh rate than most other LC screens (I am presently typing this article on a word processor which scrolls text very quickly) but you will notice the screen ghosting in a fast action game where there are small fast objects moving about.

The other major disadvantage of the Apple LC screen is its shape. The Apple LC has a 1 to 5 height/width ratio, as opposed to the 4 to 5 ratio of a video monitor or television set. The square pixels in the LC screen cause characters to appear short and bloated. Graphics will show a circle as a flat oval. It's similar to showing a wide screen movie on a television without proper compensation. You can get used to it very quickly, but don't expect to be able to do much graphics on the LC screen.

Apple made one major mistake in the packaging of the IIc LC screen. Apple put the screen into a white case to complement the design of the IIc's case. Unfortunately, the white plastic easily reflects ceiling florescent lights; not the best situation for a screen where glare is an important readability factor.

The Apple LC screen is excellent both for what it does, and for what it is designed for. If you need a portable computer which can be carried around to remote locations, then purchase an Apple IIc with an LC screen. If you only need to use your IIc at a couple of locations (e.g. office during the day and home at night) it's less expensive, and simpler, to buy two monitors and leave one at each place.

Liquid Crystal Screen
Retail price - $599

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408)-996-1010 ●

Orange Micro Introduces Two Apple IIc Parallel Interfaces

Orange Micro has announced two additions to its line of Grappler printer interface products giving Apple IIc users a link to the world of parallel printers. The new **HOTLINK** and the **GRAPPLER C** are specifically designed to interface Apple IIc computers with popular parallel printers.

The HOTLINK provides complete serial-to-parallel conversion, allowing most popular printers to be easily and effectively operated with the Apple IIc. With all hardware built into the cable, the HOTLINK simply replaces the standard printer cable. No extra devices are required, eliminating clutter from the work area.

The HOTLINK is easy to install and use. Utilizing low power CMOS technology, the HOTLINK requires no external power source and prints both text and graphics equally well. A text/graphics switch allows complete compatibility with all popular software containing printer drivers. The HOTLINK provides compatibility, flexibility, simplicity, and is warranteed for a full year. Suggested retail price is $69.00.

The intelligent GRAPPLER C performs all of the serial-to-parallel conversions of the HOTLINK. In addition, the GRAPPLER C includes special Grappler software, providing the user with graphics screen dump capabilities. Both hi-res and double hi-res graphics can be printed inversed, rotated, double-sized, or emphasized. The software uses simple file card menus and allows images to be printed from page 1, page 2, or both.

The GRAPPLER C also features built-in emulation of Apple's ImageWriter printer, making many printers immediately compatible with most software without having

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Powerful, Fast, Easy Structured Programming Language, PROMAL, Released by SMA

PROMAL (PROgrammer's Micro Application Language), a new high-level, structured programming language (similar to "C" and "Pascal") is now available for the Commodore 64 and 128, Apple IIe (with 80 column card and PRODOS) Apple IIc, and will be available in August, 1985 on the IBM PC, PCjr.; PC/XT, PC/AT and all MS-DOS compatible machines.

PROMAL was designed for microcomputers to meet the objectives that are important to the micro programmer: simplicity, power and speed. Programmers at all levels of expertise will benefit from PROMAL's fast, one-pass compiler and highly efficient run-time environment that permits applications to be written in a high-level language which prior to PROMAL had to be written in assembler for performance reasons. The Executive (operating system) provides file, memory and program management, and I/O redirection. A full-screen, cursor-driven Editor permits rapid source program entry and editing. The Library of machine language subroutines supports the run-time environment with optimized routines for file I/O, string handling, formatted output, cursor control, and data conversion. PROMAL comes with a comprehensive two hundred and thirty page reference manual.

The PROMAL compiler generates a very compact object code which, for 6502 systems, is executed by a machine-language nucleus in the Executive. It executes faster than other products which produce native 6502 code because the nucleus routines have been carefully optimized for maximum execution speed. For 808X-based machines the compiler produces true native object code. Execution can be under the control of the Executive or as stand-alone programs.

PROMAL is a proprietary language controlled by Systems Management Associates that will be continually evolving. At the source level, the language will be compatible across all target machines, which becomes significant for programmers who are looking for a completely portable language in which to develop. The Developer's Version, which includes an unlimited run-time distribution license retails for $99.95. The End-User Version retails for $49.95. Both come with a money-back guarantee.

PROMAL is available direct from SMA and at selected dealers. For more information, readers may call SMA at (919)-787-7703.

Mention that you read about it in the *Computer Shopper* ●

MACINTOSH

Macintosh BASIC

by Philip Chien

The Macintosh was the first computer to be released by Apple Computer without any programming language available. The Apple I and original Apple IIs had Integer BASIC; Apple II+, Apple IIe and Apple IIc had various versions of Applesoft BASIC. Although the Apple III and Lisa did not have built-in programming languages, they did have very powerful development tools, like Business BASIC and the Lisa Workshop. But the Mac came only with the Finder, and end users could only purchase applications, not programming tools. The only way to obtain access to the Macintosh development system was to become a full fledged software developer. People realized very quickly that although the Mac was designed as an "end user" machine, they still wanted to program with their Macs. Microsoft soon released their own version of BASIC, various other manufacturers released versions of C, Forth, and 68000 tool kits, and Apple even released an interpreted version of the Pascal language. Until now, Apple Computer has not released its own version of BASIC, (the most popular language for programming on a microcomputer), for the Macintosh.

Macintosh BASIC is finally available. However, if you are used to BASIC on another machine, or like the unstructure of BASIC, you're going to be surprised. Mac BASIC is a fairly powerful, highly structured programming language that comes with a 503 page long manual, which keeps up Apple's reputation for well-written manuals.

Mac BASIC is designed for a person who already knows how to program in BASIC. It is NOT designed for a beginner. Mac BASIC does not use line numbers. You type your program into the editor, which will check your input for syntax; your line is then parsed, and compiled. All keywords will show up in bold text. Naturally, windows are used for EVERYTHING! There is an editor window, an output window, and a debug window. The debug window will show a hand pointing at the line being executed and can be set for single step, trace, and normal run modes. Up to seven different programs can be running at the same time, each in its own windows.

Branches are handled with labels. If you are used to normal BASICs using line numbers, branch labels will take getting used to. (C BASIC also uses this system.) A label has as much meaning as a variable name. Labels do not necessarily follow in numerical order. If you have one label named "100," and one named "10" following it, the line labeled "100" will be executed BEFORE the line labeled "10." Program execution is controlled by loops, branches, subroutines, and conditional statements. GOTO is also available, but frowned upon. The manual specifically states: "Most expert programmers consider excessive use of GOTO to be poor programming practice. Code littered

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Assimilation's Mac • Memory • Disk

by L.J. Kutten

Assimilation's Mac • Memory • Disk may be the most useful program that has become available for the fat Macintosh or a Mac XL. For $29.95, the user gets a program that turns part of the Mac's random access memory (RAM) into a super fast RAM disk drive. To the Macintosh this RAM drive appears to be the same as either the internal or external flopppy disk drive. The only difference is that it only exists in memory.

Using Mac • Memory • Disk gives the user two advantages. First three disk volumes are simultaneously available; this can significantly lessen the amount of disk swapping that needs to be done. Secondly, since the drive is in RAM, it is very fast. No more waiting for the floppy disk drive to read and write the data. For example, without the RAM disk, Microsoft's Word takes almost nine seconds to load up the character format menu. With Word in RAM, it takes less than two seconds. Similar speed up were discovered when using Multiplan and BASIC.

Setting up Mac • Memory • Disk is simple. First make a backup copy of the master diskette. Then insert the copy disk into a Macintosh and open the RAMDisk application icon. A menu with four choices will appear: (1) create a temporary disk; (2) remove a temporary disk; (3) create temporary disk automatically at startup; and (4) stop creating the temporary disk at startup. Selecting either "create a temporary disk" or "create temporary disk automatically at startup" causes another window to appear. This window contains a sliding scale showing the amount of memory available for the RAM disk. This RAM disk can range from 35K to 316K. Using the mouse, click the marker to set the amount of memory desired and then click "OK." Another screen will appear that contains a list of the files that can be added included on the RAM disk automatically at startup.

When selecting files, Assimilation recommends that the SYSTEM and FINDER files be included as this prevents unnecessary floppy disk access while using the RAM disk. Since these two files take up a large amount of

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MacUniverse

by L.J. Kutten

I finally did it. I upgraded by Mac to 512K. As you may recall last month I told you why I paid Apple's high price for the upgrade. What I forgot to tell you was the fiasco that happened when I did. Your Universe Master unplugged his trusty Mac and took it to that high priest of Macdom, the local Apple service technician. He swapped the board in less than 10 minutes and said, "Here it is." Your Universe Master, having learned this lesson the hard way earlier, graciously requested that he test the unit out to make sure it worked properly. The service technician said that was unnecessary as all of Apple's boards are fine. I replied, "If you are so positive, what is wrong with testing?" He relented and ran Apple's diagnostic disk. Guess what, the 512K board was bad!

For those of you who are thinking of buying a third party peripheral disk, don't!! Apple has "officially" announced that a 20-mg external unit will be available by the fall. Once that happens, all third party units will have to be modified to meet the Apple standard.

GAMES: Your Universe Master had to pay his income taxes recently so he was very grateful when three games, Mac-Poker, Mac-Jack II, and Airborne, came in to lighten my day. After numerous hours of playing them, I have some opinions to pass along.

Mac-Poker and Mac-Jack II are both from Datapac and share a lot in common. Both start up the same way; you log in and ask for house credit. You are given a bankroll and go to the casino to play against the Mac. The screen is split into two windows. On the left is the card table and on the right is your stack of money. You start the game by using the mouse to drag money from the stacks to the playing table. Both require extreme use of the mouse to click boxes and make bets.

MacPoker is five card draw poker. As with real poker, you can bet, pass, and raise. Among features Datapac claims are built into this game are good graphics, comments by the computer against your playing style, and the computer's ability to bluff. Well, I found the graphics blase (but then how fancy can you get in a poker game); the comments boring. and the computer played a poor game of poker (originally betting $8 and then raising another $13 with only a jack high is not good poker). Other drawbacks are (1) it is outrageously slow; there are numerous delays built into the program (I have seen poker games written in BASIC that work faster); and (2) **IT CHEATS** (I had four queens and a ten which mysteriously changed into three queens, a ten, and jack - the company claimed they fixed this bug six months ago).

Mac-Jack II is Las Vegas style blackjack for the Mac. The goal of blackjack is to draw cards that total as close to 21 as possible without going over it (you automatically lose if you do). This is full featured blackjack. You can double down, split pairs, buy insurance, and even order drinks at the bar. If you want to play blackjack in either Atlantic City or Nevada, buy this game and use it to hone your skills (it honed mine).

You cannot compare Mac-Poker and Mac-Jack II. Mac-Jack is much better designed. Among features it has that are not included in Mac-Poker are sound and the ability to speed deal. Strangely enough both Mac-Poker and Mac-Jack II were written by the same programmer and he wrote Mac-Jack II first. If he writes another game, he should emulate Mac-Jack II and not Mac-Poker. Both games are $39.95. They are copy protected and backup disks are available for $5. A brief set of instructions are included and a HELP menu is in the program.

The third game is called Airborne and is a shoot-em game. You are a lone soldier defending a bunker. Enemy aircraft are dropping paratroopers who will overrun your bunker. You have an anti-aircraft gun to shoot down the airplanes and a mortar to blast the soldiers on the ground. You use the mouse to aim the mortar or gun and fire. The space bar is used to switch between them. This game has excellent graphics with airplanes flying across the screen, tanks being parachuted down, and soldiers running toward your position. The sound in the opening orchestra-

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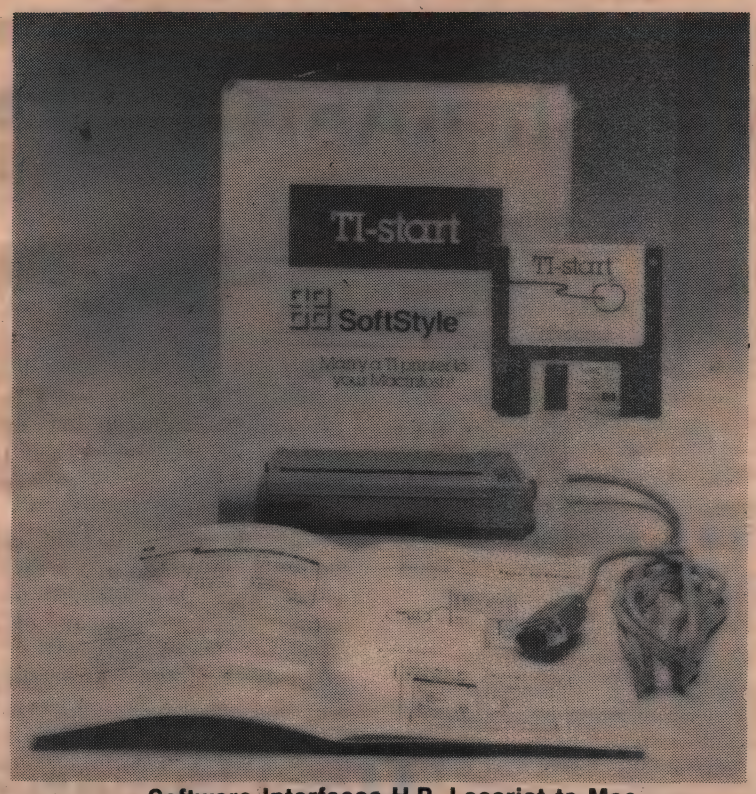
H.P. LaserJet Printer Married To Macintosh

SoftStyle, Inc. announced Laserstart, the first software to fully interface the Hewlett-Packard LaserJet printer to Macintosh computers. "Our Laserstart software, combined with the LaserJet printer, opens up an exciting new market - affordable personal laser printing for the Mac," according to SoftStyle president, Craig Slayter. "The professional and office Macintosh user can now produce both presentation-quality graphics and letter-quality printing for a cost of not much more than an Imagewriter dot-matrix printer plus a top-of-the-line daisy wheel printer. Based on the presentation graphics capability of the Macintosh along, there's also an interesting opportunity for Apple to sell the Macintosh to the large installed base of IBM PC users with LaserJet printers," he added.



Software Interfaces H.P. Laserjet to Mac

Taking advantage of the crisp imaging available with laser printing technology, Laserstart makes possible a low-cost alternative for fast, quiet, laser-quality printing of graphics and text from the Macintosh. In the Macintosh Standard printing mode, the LaserJet prints text and graphics at 75 dots per inch for previewing documents and producing high-contrast images. In Macintosh High printing mode, Laserstart prints text and graphics at 150 dots per inch, particularly enhancing printing of Macintosh fonts.

In Macintosh Draft printing mode, Laserstart uses the LaserJet printer's built-in or plug-in cartridge fonts for both high-speed and letter-quality printing of text (300 dots per inch, with character smoothing). Laserstart automatically selects the LaserJet cartridge font providing the best match to the Macintosh font's spacing (fixed or proportional), point size (character height), character style (upright or italic), stroke width (light, medium, bold), and typeface. Laserstart also prevents word "collisions" and extra spaces between words (created when the Macintosh font does not exactly match any of the ROM fonts available on a printer).

With a simple menu selection, the user installs the Laserstart program once on MacWrite, MacPaint, or other application disks to modify the printer drivers for support of the LaserJet printer. The modified printer drivers then run transparently whenever the user prints a document. The user can specify either printer or modem port and can change back to the standard Imagewriter drivers at any time by a simple menu selection.

Laserstart also adds a "Print Adjustment" desktop accessory to the application disk. This accessory allows the user to select any one of the eight Hewlett-Packard LaserJet cartridges currently available (containing 22 typefaces) and to specify the number of copies to be printed, which speeds up printing of multiple copies.

Laserstart is priced at $95 suggested retail, which includes a standard Macintosh printer cable. Laserstart is compatible with virtually all Macintosh application software. It supports the 128K, 512K, and XL Macintosh computers. It is also being distributed by Hewlett-Packard.

Laserstart is one of the Start series of Macintosh printer interface software packages from SoftStyle, including Jetstart for the Hewlett-Packard ThinkJet, Epstart for Epson printers, and TI-start for the Texas Instruments 850XL/860XL and 855/865 printers.

For further information, contact: SoftStyle, Inc., 7192 Kalanianaole Highway, Suite 205, Honolulu, HI, 96825, (808)-396-6368.

Mention that you read about it in the *Computer Shopper*. ●

MacUniverse
Continued from page 45

tion is the best I have ever heard. Overall the game shows an excellent design. The program costs $34.95 and a replacement disk is $5.00. It is copy protected.

Three Magazines for the Mac: I am sure most of you have read MacWorld at one time or another. If you are like me MacWorld was interesting and useful early in your Mac career. While it is still a good magazine (I would read it just for the advertisements), it just does not make the grade with me anymore. To me it appears that the editorial content was taking a second place to the advertisements. I was really getting despondent when three dedicated Mac magazines came my way. They are not as slick as MacWorld, but contain good solid Mac information.

The first magazine is called **MACazine** and is published by ICON Concepts. It is oriented toward the average Mac user. Every issue contains commentary on recent developments, tips on using the Mac, and software reviews. It is very similar to MacWorld except in MACazine the advertisements take a definite second place to the articles. The March issue ran 64 pages and contained (1) reviews of Microsoft Word, Omnis 2, and MacPublisher; (2) two columns on tips and suggestions for the Mac; and (3) four articles on using the Mac in general. It is slightly overpriced at $18.00 a year, but then what is good solid information worth.

The second magazine is **The Club Mac News.** It is the user group newsletter of Club Mac, a national Mac users' group. The April issue was 62 pages and contained five software reviews and five columns. It is not cheap; subscriptions are $35.00 a year which include your membership dues in Club Mac (this entitles you to their discounts and access to their public domain files).

The final magazine is **MacTutor (formerly MacTech)** and is for dedicated programmers. It covers C, Assembler, Pascal, Forth, and BASIC. It conducts ongoing clinics for all of the major programming environments on the Mac. It costs $24.00 a year.

Editor's Note: Another magazine called MacUser will appear shortly. It is edited by Neil Shapiro of MAUG.

A Disturbing Trend: Recently I received a book called WillWriter. According to the publisher, Nolo Press, and the author Legisoft, it is "a computer program and accompanying manual which permits the average person to efficiently prepare his or her own will." The book is representative of many self-help programs I have recently seen. Supposedly these programs "computerize" the knowledge of accountants, business consultants, lawyers, and the like. Their purpose is to let the user avoid hiring an expert. Now I do not know if WillWriter works or not and I do not care. But I feel these types of programs may untimately do more harm than good.

The purpose of using an expert, for whatever subject, is that the expert knows when the standard rules apply and do not apply. The average non-expert does not have this knowledge. So what happens to a user if WillWriter does not work? What guarantees will Nolo give you? There appears to be none. As their manual says:

Of necessity, therefor, neither Nolo Press nor Legisoft makes any guarantees concerning the use to which the WillWriter program or manual is put, or the results of that use. In other words, any will you write using WillWriter is yours and it's your responsibility to make sure it carries out your intentions. If you want a legal opinion regarding the legal effect of any will you write using WillWriter have it reviewed by an attorney in your state. Also, if you become confused by an aspect of WillWriter or the manual, we recommend you talk to a lawyer before further use."

What has the user got when he uses this or a similar program? Maybe a great deal or maybe nothing. The only way to find out is to hire a lawyer or another expert to double check the program. But hiring the expert defeats the purpose of using the program.

So where does this lead? I wish I knew. But before anyone rushes out to buy this or any other "expert" program, he should ask himself one question: "Will I know if the pro-

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Mac Memory Disk
Continued from page 45

memory, Assimilation provides a separate SYSTEM file that has all of the desk accessories removed except the control panel. Use it if a large application needs to be run. As a practical matter, it probably will not be needed. If necessary more space can be saved by replacing the standard 45K FINDER with one of the public domain mini-finders available. For example, the UFINDR.HQX mini-finder uses only 3K. Using both the mini-finder and Assimilation's SYSTEM file will leave 266K for other uses.

Mac • Memory • Disk comes on an unprotected disk with a brief nine page manual. The manual is skimpy and experimentation is necessary in order to fully utilize the program. However, before you rush out and buy Mac • Memory • Disk there are three warnings. First, not all programs will work with it. Some protection devices require continued access to the master disk (e.g. MacPascal and Sargon III). If the same file is found both in the RAM disk and the physical disk drive, it will be read off the physical drive. Secondly, as the RAM disk is smaller than a physical disk drive, the Disk Copy utility will not work. Files must be copied individually. Finally as this drive exists only in RAM, it is not permanent. If a file created on it needs to be saved, it must be copied onto a physical diskette before turning off or resetting the Macintosh. Failure to do so will cause the file to be lost permanently. ●

TANDY COMPUTERS

Beam-Aimer/Navigator Program

by Fred Blechman

Introduction

This program, written in generic Microsoft BASIC for virtually any microcomputer, allows you to determine the shortest distance and direction between any two points on earth, given the location of each. This is of particular value to amateur radio "hams" and short wave listeners for determining the proper direction to aim their directional antenna. Also, this program, without modification, can also be used for long-distance boating and aircraft navigation as well.

The program uses spherical trigonometry to calculate the lengths and angles of a spherical triangle between the starting point, the destination and the North Pole. You won't require any knowledge of math to use it. It will be explained in some detail, however, for those that wish the "mental exercise" and mathematical verification.

Program Description

The program is shown in Listing 1. It starts with instructions on the screen, assuming use for long-distance (DX) beam antenna aiming. Next you're asked for the name of your station point and the target station, then their latitudes and longitudes. For navigational use, these would be the starting and ending locations, and can actually be any two points on earth. You must also specify if the target station is east or west of the starting point. (If you enter this last item incorrectly, you'll end up with the aiming direction exactly 180 degress off.)

The program summarizes your input information then quickly gives you the angles of each point from the North Pole, the nautical and statute miles between the two points, and the direction in degrees, measured clockwise from the North Pole.

Discussion

While most readers will not find direct use for this program, it does illustrate the sophistication that can be accomplished with plain ole' Microsoft BASIC. The trigonometric functions (including some that most implementations of BASIC don't support) are liberally exercised, and the techniques used can provide examples for programs of your own.

Hams, Airplane Drivers, and Sailors

If you operate DX (long-distance) on your ham radio, do much short-wave listening, have an airplane or do any long distance sailing or boating, this program will be of very definite value. Why? Because maps are notoriously inaccurate for long-distances.

Pilots and sailors can use this program to accurately determine the distance and direction from where they are to any point on Earth. Hams and SWLs (short-wave listeners) can use this program to determine the proper direction to aim their antenna for maximum signal strength.

Many charts are available that give the distance and direction between major cities - but not from where you are to where you want to go, unless your origin and destination are both major cities. With this program, you can "start" and "stop" anywhere!

Maps Are Wrong!

When I went through navigation courses as part of my flight training to become a Naval Aviator, I became aware of the compromises made in trying to reduce a spherical surface (the Earth) to a flat sheet of paper (a map). It just can't be done accurately for long distances. If the angles are correct, then the distances are distorted, and visa-versa.

Probably the most common map of the world, or large areas of the Earth, is a Mercator Projection, where all the latitude (horizontal) and longitude (vertical) lines are straight and perpendicular to each other. While this is easy to read, it is notoriously inaccurate for navigational purposes. Although the old expression that "the shortest distance between two points is a straight line" is certainly true in spacial relations, it is totally false on most maps!

Down To Earth

In the case of a spherical solid object, such as the Earth, the shortest distance along the surface is called "a great circle," and is the intersection of the surface with a flat plane that passes through the center of the sphere. You can estimate a great circle by using a globe and a string placed between the origin and the destination, but the accuracy is limited by the size of the globe. This program is accurate to a small fraction of 1 percent!

Program Anatomy

The program is identified in line 10. Line 20 DIMensions the A-array for twelve locations, A(0) to A(11). Array locations A(1) to A(11) will be used later as a convenient place to hold variables in an organized fashion. Why did I use arrays? I originally wrote this program for a computer that only had single-letter variables (A-Z), and it was necessary to use arrays as variables to keep some sense of order. When I translated the program to other computers I retained this approach. Besides, it is good for you to get used to using arrays so you won't be afraid of them when you really need them!

Lines 100-180 clear the screen and introduce the program. Line 190 waits for you to press ENTER. Although the listing shows line 190 in lower case, upper case may be used.

The Earth And Terminology

Before going any further, look at Fig. 1, which shows a typical spherical triangle and labels it with the variables we'll use in this program. "Longitude" lines are those parallel lines going north and south, and (although not shown in this diagram) passing through the poles. These are "great circles," and used to specify angles east or west of Greenwich, England, which is considered zero longitude. A typical longitude specified in decimal degrees, might be "longitude 115.35 E."

"Latitude" lines are lines go-

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The Correspondent, Complete Mailing Software for TRS-80

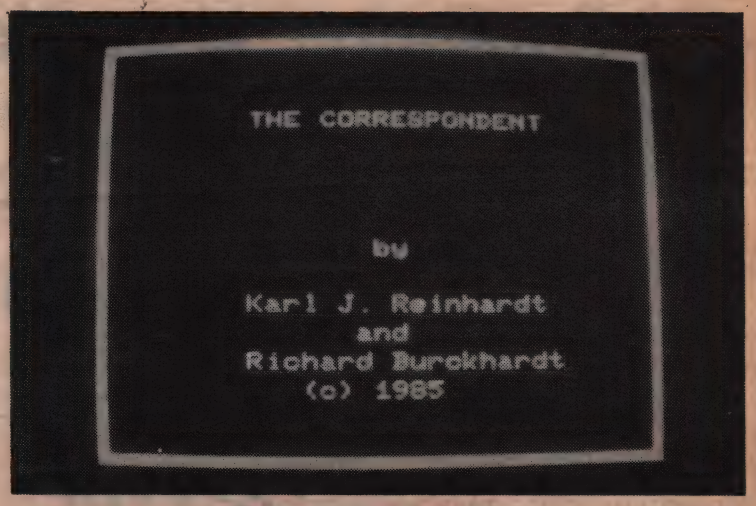
Part 1 of 2 Parts

by Karl J. Reinhardt & Richard Burckhardt

If you're like us, you have mailing list programs and word processing software coming out of your ears. The problem is, inexpensive software in these categories generally won't allow merging of names and addresses into form letters, nor do they provide easy ways to produce and address short mass-mail pieces like postcards.

Being the type to get involved in things, we were constantly dealing with organizational mailings for small groups. Using Newscript or other fancy word processors which support mail merging was ruled out due to the time involved with setting up and formatting the software. We wanted something that anyone could use without having to spend hours digging through manuals.

The Correspondent came about as a result of two people writing programs for totally different functions and combining them for additional ones. Two of the programs, Cardwriter and Address Book, originally provided a postcard writing program and a personal mailing list. With a few enhancements (and considerable rewriting), we have



Correspondent Screen

come up with a total correspondence center featuring mass-produced postcards, rolodex cards, mailing labels and form letters, as well as a mailing list data base with keyboard, birthday, area code and last name search, a machine language sort, and several print options, including a list format, rolodex cards, and even an option to address single envelopes or postcards.

The package was written on a disk-based TRS-80 Model III with 48K. Because the sort uses the CMD"O" feature of TRSDOS 1.3, the sort routines would have to be rewritten for the Model 1 or another DOS. An example on converting the sort to use the Basic Quicksort algorithm is included as the program CARDSORT. The POKE routines are also Model III specific, but could be removed without seriously changing program operation. They are mostly cosmetic, providing a non-scrolling banner at the top of the menu screens and setting the maximum page width for printing. As far as we can tell, the programs should run on a Model 1 with these changes.

Special print functions such as condensed type for the rolodex cards and double-sized characters for headings are

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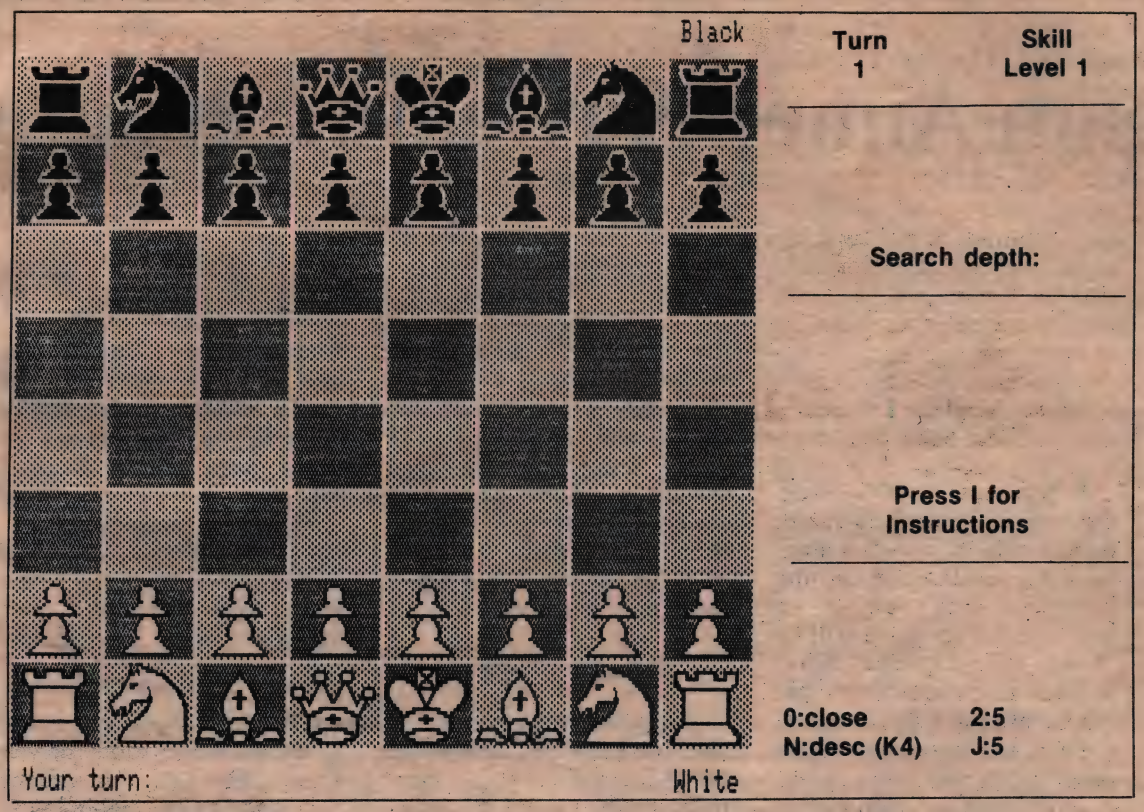
Tournament Chess

A Review
by Lon Andrews



Rapidynamic Software has released a tournament chess program for the TRS80 Models III and 4. If you have either the Radio Shack or Micro Labs High Res Graphics board the program will make use of the High Res Graphics and produce an excellent Chess board on the screen.

The program is supplied on a RAPIDOS disk for either Model III or Model 4. From RAPIDOS ready enter Chess and prompts appear to allow you to choose which Chess program you want to run. For the Model III there are three options: Low-Res Block Graphics, Hi-Res 512 x 192 and Hi-Res 640 x 240 Graphics.

After you have chosen the type of program to run you are asked if you want instructions or want to start a game. The instructions explain how to make a move and how to carry out various options available to the player. With this program you are playing the computer. The documentation explains the various types of moves in Chess and the reason for making them. The doc's do not teach you to be a Chess Player but they do a good job in helping you around the ins and outs of the program. Some knowledge of the game is necessary - more than yours truly possesses.

Even with my meager knowledge of the game I was able to manuever through the game with the info in the doc's. Legal and illegal moves are listed and explained. You can use Algebraic Notation or Descriptive Notation during the game and can change back and forth during the game. all the descriptive terms and methods are covered in the manual

The program is memory resident and the disk can be removed after the program is loaded. A data disk can be placed into any drive to save or load a game. There are twenty-five game options offered from a menu available from the opening screen by pressing "@".

With all these options to keep track of I was mind boggled. Not so with my Chess playing friends. No Problem!! It is as simple as falling off a log. Well, it isn't all that simple to me but I managed. From the first list of options you can

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New Multi-User Tandy 6000 Computer Uses Xenix 3.0

Tandy Corporation now offers the Tandy 6000 computer with XENIX 3.0, the latest multi-user operating system from Microsoft. Tandy's benchmark tests show the 6000 operates at approximately twice the speed of its predecessor, the Model 16/16B. Standard memory on the Tandy 6000 computer is 512K RAM, double the standard memory on the Model 16B. Memory on the 6000 is expandable to a maximum of one megabyte.

Businesses can save on the cost of purchasing a separate computer for each individual employee because three to six employees can access a single Tandy 6000 computer at one time, by using two (or more) terminals. The optional printer, modem and other accessories can be shared by everyone on the system.

The 68000 microprocessor accepts 16-bit data and processes it internally as 32-bit "words." A second

Continued on page 115

FasType

A Review
by Lon Andrews

FasType by Press A Software turned out to be a little different than I expected. Written in machine language for the Model III or the Model 4 the program is supplied on a self-booting disk along with a documentation foldout that serves as a reference card.

The program is designed to teach touch typing with the TRS 80 keyboard in mind. Since I am a confirmed Hunt 'n Peck typist FasType received a whale of a work out. I would like to report that I have become a 100 word a minute touch typist but there are few miracles these days. FasType has changed some of my habits and as I work with it I find that my style or technique of typing are changing for the better. If I devote the time to it FasType will eventually win out I am convinced, but the magic word is time...

No program in the world will make you an instant expert typist. Practice is required to gain proficiency and practice takes time. FasType will make it easier and will make it possible to move the typing lab into your home. As it is geared to the computer keyboard and operation it makes life around the computer a little easier. No disrespect intended but FasType is a heck of a lot more fun than the (few) typing classes I have attended in school.

When you boot FasType a three part screen appears. The top of the screen is reserved for instructions. The middle of the screen is where the exercise to be typed is displayed and the bottom area displays prompts to get you started and keep you going.

The cue card provides a sketch of the keyboard showing the keyboard and which finger goes where. The trick is to develop the proper technique.

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Now! Windows For TRS-80

A Review
by Richard Burckhardt

Everywhere you look these days software companies are extolling various and sundry windowing applications for computers. Most of these are for the likes of the IBM PC and the Apple Macintosh, but a few brave souls are announcing windows for 8-bit machines like the TRS-80.

Windowpad - The Integrated Windowing and Note Processing Utility is just such a product. En Fleur Corporation, producer of the software tells you that the program "enables the operator to (1) work independent of an application program; (2) write, recall and edit notes efficiently; and, (3) set timed Pop Up Window Memos."

It does, indeed, allow all of this, but in a minimal sort of way. Windowpad will work on the 16K, 32K, and 48K Model I, III and 4. It takes up to 6K of memory, though, making use on a 16K machine impractical. In fact, 6K is fairly expensive even for a 32K or 48K machine. Some of my favorite word processors and spreadsheets cannot be used along with Windowpad because they are already a tight fit memory-wise.

Windowpad comes on a formatted TRSDOS data disk (or on-tape for tape users) and includes a very nice operation manual. The manual, however, appears to have been produced on a Macintosh. It seems to me that, at a time when TRS-80 users are being dropped in favor of the likes of IBM PC and Mac users by software vendors, this is in poor taste. It makes me feel like an orphan being catered to out of pity.

With the exception of a few typos, the manual is more than sufficient for operation of the program. After loading Windowpad into memory, the title of the program will be displayed briefly before the TRSDOS Ready prompt appears. At this point, you can run any application program that will fit into available memory. To recall Windowpad at any time, all you do

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THE BUCK STOPS HERE

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COMMODORE

Inside The VIC-20/Commodore 64

Mass Storage Options for your Commodore (And Building a Parallel Printer Interface - Part 4)

by Ted Drude

A Quick Glance At This Month

VIC-20 users will finally be getting their listing of the Centronics (tm)-compatible parallel printer driver that works with the User Port interface from the April issue. Commodore 64 owners will also get an updated version. For you "hard core" assembler programmers, I am going to highlight various sections of the driver source code so you can get an idea of how to add new device drivers to the KERNAL system.

Those of you who aren't interested in the technicalities of the printer driver might find the diskussion (sic) of the various Commodore floppy drives informative. If you're like me and find yourself running out of disk space all the time, it might be helpful.

The Parallel Printer Driver - Version 2 and Higher

Last month, I presented a new version (2.0) of the Centronics parallel driver for the 64. This month, I've got a version (2.2) for the VIC-20, and yet another version (2.1) for the 64. I am going to start numbering each version, so we can keep them straight. I am presenting the BASIC loader versions of each program. When these are RUN, they POKE a fairly short Machine Language program into the 64's RAM buffer starting at 49152 ($C000), VIC version 6656 ($1A00). The length of the actual ML program varies with the version. Version 2 is about 535 bytes or so.

Version 2 of the printer driver is not the final version, but is fairly de-bugged and will form the basis for other versions as I can get them done. The 64 program I presented last month (ver. 2.0) had some well hidden bugs that are taken care of by ver. 2.1. The VIC program was written after I fixed the 64 version, so it avoided the problems altogether.

There are still some significant improvements that I intend to make to Version 2 when it gets upgraded to Version 3. That includes PETSCII to ASCII conversion, BASIC LISTing processing, and some type of graphics conversion. This may take a while to complete, but I will present the results in the **Computer Shopper** just as soon as I have something working.

Attention VIC Users:

If you are using a VIC-20, please take note:

The initial version of the printer driver will work with both expanded and unexpanded VICs. If you have an unexpanded VIC or a VIC with just the 3K RAM expander, you can LOAD and then RUN the BASIC loader with no problems. It will grab free RAM from $1A00 up, so you will only have 768 less bytes of RAM available when using the printer driver (2500 bytes or so available for use in an unexpanded VIC).

If you are using a VIC with an 8K or larger RAM expander, the memory map of the VIC gets moved around by the KERNAL on power-up, so that standard BASIC loader and ML program will not work without some modifications. The easiest way to remedy the problem is to type in the following one-line program **before** you LOAD and RUN the BASIC loader:

```
POKE 641,255 :
POKE 642,28 : SYS 58232
```

This moves top of BASIC to $1CFF and leaves the ML driver safe from interference. It also cuts off about 2.5K of BASIC RAM off the total available, so don't be shocked when the "BYTES FREE" message is a lot lower than it was before! You can't use the lower 2.5K if you want to use the printer driver as it stands. As an alternative, you can relocate the driver program elsewhere.

If you need to relocate the driver program, you will have to get the Assembler source (see last month or the end of this article) and re-assemble it. Sometime in the future, I hope to have an auto-relocating version that will "hide" the driver at the high end of BASIC RAM. For simple BASIC, $C000 (or $1A00) is fine.

Initializing the Program:

After the ML program is in RAM, you must then "SYS" to it in order to initialize the driver. This is a simple "SYS 49152" (or "SYS 6656" for VIC). You may then "NEW" and erase the BASIC program from memory (make sure it is SAVED first, though!). The VIC BASIC loader set top of BASIC lower than the start address of the printer driver. This protects it from being over written. You must do a "NEW" or "CLR", however, for this to be assured. Since the 64 version of the printer driver loads into the $C000 area of the 64, this step is unnecessary. It is already safe from BASIC.

The actual details of how to use the program were explained last month. Basically, after the "SYS", you may then OPEN your Centronics printer as device # 4. For example: "OPEN 4,4,0". You may then "CMD 4" or "PRINT#4" to get output to the printer, just as you would with the Commodore printer.

If your printer is printing everything on one line, you can OPEN the printer file with a file # greater than 127 (e.g. "OPEN 128,4"). This will add an LF to every CR automatically. Or, you may OPEN the printer with a Secondary Address of 1. (e.g. "OPEN 4,4,1"). The first method is handled by the KERNAL ROM. The second is supported by the printer driver. Either way works fine.

If you want to switch the printer driver to another device number, just POKE 49577 (VIC - POKE 7066) with the new device number you want to switch to. For example, after "SYS 49152" do a "POKE 49577, 5". This will set up the printer driver as device # 5 instead of # 4.

OverView of the Program

Here is a general outline of the printer driver and its main routines:

I. Initialization.
A. Save Old I/O Indirect Vectors.
B. Install New I/O Indirect Vectors.

II. New Device I/O Routines
A. OPEN Routine.
B. CLOSE Routine.
C. CHKIN Routine.
D. CHKOUT Routine.
E. CHRIN Routine.
F. CHROUT Routine.
G. GETIN Routine.
H. Utility Routines.
I. Error Handler Routine.

III. Tables
A. Internal Registers.
B. Old I/O Indirect Vectors.
C. New I/O Indirect Vectors.
D. Vector Table Work Area.

If you are going to write a new device driver "by the book," you have to account for most of the points above in your program. If you don't go "by the book" you can crunch your device driver to probably 50% smaller in size. You can also lose portability, control, and compatibility. The choice is yours. You have to decide at the outset whether you will "play by the book" or not.

Quite frankly, there aren't too many people who do play by the book. Most programs I've seen, including some from Commodore itself, ignore the built-in power of the KERNAL. They often bypass the RAM vectors and jump straight to ROM routines and other such nonsense. Yet, for those who obey the rules, there are benefits waiting.

The most blatant violations of KERNAL rules often comes during program initialization. This month we'll see the "correct" way to initialize a program, using the printer driver as an example. For those of you who have ordered the full Assembler source code, this should be most meaningful. Next month, we'll look at some of the other portions of the program.

```
;* READ IN THE CURRENT VECTOR TABLE *
;
        LDX #<WORK      ;READ INTO  RAM
        LDY #>WORK      ;WORK AREA.
        SEC
        JSR VECTOR
;
```

```
;
;*****************************************
;*                                       *
;*       VECTOR TABLE WORK AREA          *
;*                                       *
;*****************************************
;
WORK      = *
CINV    * = * + 2
CBINV   * = * + 2
NMINV   * = * + 2
IOPEN   * = * + 2
ICLOSE  * = * + 2
```

Initializing a New Device Driver

In order to divert input and output away from the normal ROM routines, you must use the proper method. Some people "wedge" into the KERNAL and steal I/O vectors for their routines with absolutely no regard for anyone else. This doesn't have to be. Commodore has thoughtfully provided a KERNAL routine that allows us to "wedge" our own routines into KERNAL RAM while preserving the pre-existing environment as much as possible. This is the "VECTOR" routine.

VECTOR allows us to copy the KERNAL I/O Indirect Vectors at $0314 - 0333 (that's 16 vector addresses or words) to a RAM work area, where we can perform surgery on it. Before we do that, though, we want to save the vectors we are going to modify, so we can jump to them if we need to.

Here is what it looks like in Assembler:

The Programmer's Reference Guides elaborate on this extensively.

Now, we've got the old RAM vector in memory at a location that begins with the label "WORK". Here's what "WORK" looks like:

AND SO ON...

Now what?

Continued on page 122

PROMAL - A Comprehensive Structured Program Development System

by Albert Koller, Jr. and Michael Koller

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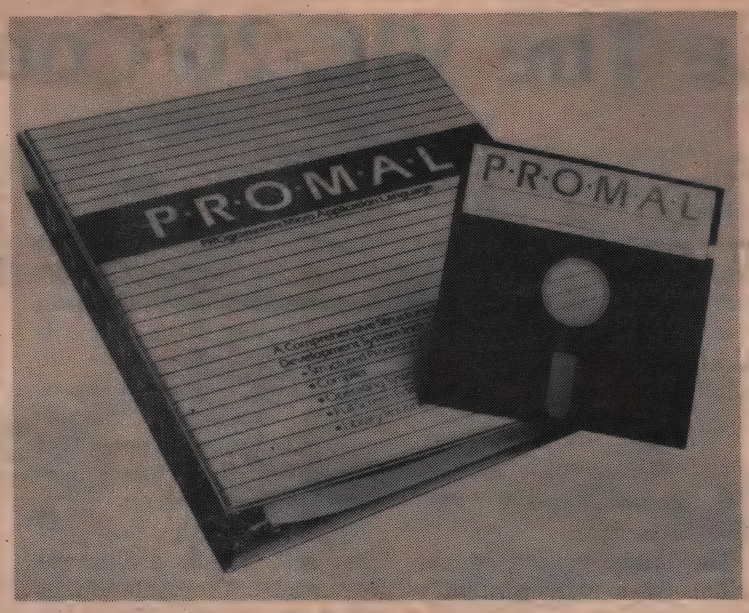
Similar to Pascal, the PROMAL language is hierarchical, meaning it manages program elements by level of indentation rather than by line numbers, GOSUBs or GOTOs as BASIC would do. It does not require (or permit) line numbering, and compiles to a very efficient code which runs at near machine language speeds. Programs are saved in both the source (Name = XXX.S) and compiled (Name = XXX.C) forms, and a date assignment feature activated at sign-on automatically labels new and revised files as they are generated. New and old versions of the same program can be easily distinguished, or you may overwrite the older version, replacing it automatically with the newer one when you wish.

Although neither of the authors had seen or used PROMAL before, the initial uses of the language were fairly straightforward, and this evaluation was made using the system to develop and implement a program in comparison with Commodore BASIC, MBASIC and Pascal running in the C/PM mode. This is how the system stacked up.



PROMAL Language

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From a new user standpoint, the developers of PROMAL have done an outstanding job of providing maximum flexibility at minimum risk. The total package consists of a Demo System (read-only disk and 32 page introduction manual with "hands-on" exercises - $10.00), an End User System (the above plus full-service disk, 60 page User's Guide and 90 page Language Manual with 15 Appendixes and an Index - $49.95), and the Developer's System (all of the above plus augmented System disk and 9 page Developer's System Guide - $99.95). The Demo Disk is packaged separately from the System Disk and the user is cautioned not to open the System Disk package until the Demo Disk has been tried and the user is satisfied. The package states: **"Our Guarantee: You must be satisfied with PROMAL. Try it for 15 days. If you are not satisfied, return it in new undamaged condition for a full refund."** This offer applies to all but the Demo Disk System, which can be purchased separately for $10.00 but cannot be returned. That's about as fair as any offer we've seen in the computer software business.

Documentation

The documentation package for the overall system is very well done, with only a few (but important!) shortcomings noted. It is written professionally and presented in a quality 3-ring notebook for easy use. The Index is a welcome change from most of the documentation we are accustomed to seeing. Many examples are given, including program fragments to illustrate each of the key operators and commands in the language and each of the modules (Executive, Editor, Compiler, Library, Developer System). Each section takes the reader to progressively more complex manipulations of the language, and the Appendixes provide data for memory maps, key codes, library routines, special function support, and even specialized disk utilities (resident on the System Disk) for copying, etc. Learning the language is not "automatic," since many commands from BASIC are not supported, so frequent reference to the manuals and the disk for included examples and sample programs is necessary.

The Executive

The PROMAL system is loaded using a boot program which calls the Executive, Editor, and Library into memory. The compiler is not loaded until/unless it is needed so that more workspace is available for direct calls from the Editor and the Executive. When the system finishes loading, the user is provided with an information screen describing PROMAL, copyright, etc., and asking for MM/DD/YR to activate the automatic date label used for saving to disk. The user can bypass this feature (which can be bothersome if you must reboot often as we did at one point) by simply hitting RETURN. The system then defaults to the Executive which returns a menu for the eight function keys and a prompt for user input as shown in Figure 1. The commands are self-explanatory, and 'HELP' will provide more detailed explanations for forgetful programmers!

```
F1 = EDIT
F2 = DUMP
F3 = COMPILE
F4 = GET
F5 = FILES
F6 = MAP
F7 = HELP
F8 = COPY

= =>_
```

Figure 1. PROMAL Executive Manu

A very nice feature of this menu is that it will not execute until you 'enter' the command from a function key by hitting 'RETURN'. The user can hit two or three keys to find the one he wants and then execute the function.

The Executive has been empowered with 24 built-in commands which do everything from changing the screen and border colors with two keystrokes to unloading memory so additional programming space can be made available. Many of these are quite useful and would make the programmer's job far simpler **if they were available for copy into the Library.** Alas, they can be used at will while in the System mode, but they

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Free Delphi Network Membership For Computer Shopper Subscribers

first part of our electronic publishing experiment

Computer Shopper has arranged for all of its subscribers to join the Delphi Network with no signup membership charge. All you will be billed for is the actual time you spend on the network. In fact you can also get a free hour of non-prime time network experience when you sign-up. This is a value worth about $60 and it costs our subscribers nothing. Our reason for making this offer is simply to have you with us in our experiments in Electronic Publishing. We will be providing the special merchandising specials in the shopping areas in each of the Delphi Special Interest Groups (SIGS) and in addition we will electronically publish supplements to Patch Publishing's magazines, *Computer Shopper, shutterbug ads/Photographic News, Merchants Times* and *Video Shopper.*

Delphi is a national network with many unique features including some of the most active SIGS to be found anywhere. There are so many features, that I haven't room to describe them. Best way to learn about them is to sign on Delphi and take the guided tour.

Here is the sign-up procedure for the *Computer Shopper:*

1) Call your local Uninet or Tymnet number:

If you don't know the number you could either call Uninet's 800 number 1-800-821-5340 (in Missouri 1-800-892-5915) or call Delphi's Customer Service number 1-800-544-4005 except in Mass. 1-617-491-3393.

2) On Uninet, type <RETURN> . <RETURN> (that's carriage return, a period, and a carriage return).

Uninet will then prompt you for "Service" and type either GVC or DELPHI .

Delphi will then prompt you for username:

3) On Tymnet, type the letter A when it asks for your terminal identifier.

This may not come out as actual letters if running at 1200 baud. Anyway, just type in the letter A (a carriage return is not needed).

Tymnet will them prompt you for PLEASE LOG IN: and you should type in the word DELPHI .

4) Once you have reached the username: prompt, type in SHOPPER. Delphi will then ask you for your *Computer Shopper* subscriber's number from your mailing label.

You will then be asked for name, street address, city, state and zip and billing information.

Next, you will be asked to choose a username.

We will then issue you online, a temp. password that will be good within 24 hours.

Once you log on with that, we will give you a guided tour and ask you to change your password, and tell you to write it down. You will then get one free evening time hour.

If you are not a subscriber but want to take advantage of this offer, you can sign-up for both *Computer Shopper* and Delphi at the same time. ●

SANYO

The Wild, Wide Color Hardware of "Funtastic" Sanyo

Editor's Note

Richard Fujita's column this month should be read by everyone who uses Floppy Disks, not only Sanyo users.

by Richard Fujita

This month I want to brag about my SANYO before I continue with the subject of disk drive buying and installation problems. I have never heard about the fantastic color capability of the Sanyo computer before I found it out in the hardware schematics. Even the neighborhood salesman in the computer store in West Los Angeles, who sells lots of Sanyos, was unaware of it. The Sanyo has 640 x 200 full color resolution with 48K of RAM dedicated to backing it up. The real color capability of the Sanyo surpasses that of the IBM Color Board but the full capability has never been demonstrated. This was cleverly hidden in the same manner as often pointed out in this magazine. There is a complete void for this magnificent color capability and no software to demonstrate it. None!

One more of the non-public, public domain open facts is that the same color capability can be readily seen in Japan. If you walk into almost any one of the hundred or so computer shops in Akihabara district in Tokyo you will see fantastic color images on the computer video screens. Some of them are like fine paintings painted laboriously with the keyboard and some are a frame of animations or comic strips but in such vivid and gorgeous colors you've never seen before on any tube. Unfortunately, Sanyo is a dim name in Japan as far as computers are concerned. They sell lots of refrigerators and washing machines, instead. The Sanyo has the same color capability as other popular personal computers in Japan and the Sanyo must have felt that it is not necessary to demonstrate it if the capability is there on the catalog specifications. Next time when I have an occasion to visit Tokyo, I will get one of these fine color designs and distribute them at the cost of diskette to any computer salesmen who sell Sanyo computers, if Sanyo doesn't do it before I do. I honestly hope Sanyo will do it before anybody else does it so that their dealers have some help to show the true capability of the machine.

One other thing I have to mention is that **Computer Shopper** and the dealers advertising in it will try wholeheartedly to help Sanyo users if they have some troubles with the machine. At the least this column, with the valuable cooperation of some Sanyo user's groups, will try to do anything possible to help hapless people who were deserted by dealers. The other day, I read a horror story of a stranded Sanyo user with a troubled machine on his desk with no hope of help from Moonachie nor his dealer, who wrote a desperate warning message in a letter to one of the better known computer magazines, which published the letter and, I'm sure, the editor wrote a warning letter to the dealer. But, the **Computer Shopper** is a unique magazine which is always one more step closer to the readers than any other computer magazine, and its columns are willing to take further steps to solve the problems for the computer user... Wait a minute! I think I have gone too far and told more than enough about the well hidden color hardware of your Sanyo and then some - sensitive subject. I must now return to the nitty gritty of the bargain disk drives.

Buying The Bargain Disk Drives

I just started to talk about disk drives in the last issue. At the present, so many drives are being offered by so many mail order people and many of the drives are relatively new types and most of them work very fine. When you buy, make sure: 1) You get at least a 90 day written guarantee, 2) You get the installation manual with it, 3) Get the double sided drives anyway even if your present machine can use single sided drives only. The price difference is miniscule and they work equally fine as single sided drives. These drives sold by mail order usually work fine, but as I mentioned before, there are some people who wind up having one or two drives they can't use, either by the problem in the drive itself or by a little problem of just a few signal mismatches, like when using IBM COMMAND module which you get when you buy PC DOS and the price happens to include the DOS 2.10. I will talk about the difference between IBM DOS 2.10 and Sanyo MS DOS 2.11 later, but as I pointed out in my last article the IBM COMMAND module for DOS 2.10 does not issue 'motor on' signal and this fact causes "Drive not ready" error. You cannot expect a drive to function if the motor is not running. Many people do not realize this simple fact and the problem becomes unsurmountable. One of my friends got an IBM clone entirely made on one of the Far East Islands and had this problem, exactly the same one I have experienced with my beloved Sanyo even though he ordered IBM compatible drives.

Bargain Drive Installation Problems

That problem can be corrected with a simple option change. Today, all the Japanese drives have the Direct Drive Motor turning the disk, while most American models until early 1984 had used some kind of DC Motors, of which Buehler is the one frequently found in such drives. The motor may run on an average of 2,000 to 3,000 hours, but some engineers told me they saw lots of them which quit prematurely. When the drive is near its death, it starts producing lots of noises which interfere with the legitimate signals and the rotating speed becomes erratic. The speed deviation sets clock recovery circuits off their tracks. This means that you start to get lots of reading errors and whatever the drive has written may not be read successfully, not only by the same drive but also by other drives as well. If this happens you need a replacement motor or a pair of new carbon brushes together with a complete cleaning and lubricating job. Anyway, the brush type DC Motors have comparatively short lives with one exception. That is the type called coreless. The coreless motor has no rotating iron or magnet. It has coils inside magnetic poles. The absence of iron inside the coils reduce the inductance which stores electric energy in the form of magnetic energy. Like sparks produced by the automotive ignition coil, the size of the sparks produced by the brushes and commutator have direct correlation with the rotor inductance among other factors. Lower inductance normally produces less sparks and prolongs brush life. In coreless type DC motors, the usual life of the motor averages about 5,000 hours of operation. The drawback of this type of motor is high cost and its fragility. The coils have very low heat inertia which translates to quick heat-rise under heavy load. The resulting heat tends to distort or burn the armature coil more readily than in other types. Because its cost is twice to three times that of an ordinary DC Servo Motor, you don't usually see Coreless

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Book Review
Sanyo MBC 550/555 Beginner & Intermediate Guide

A CBS BOOK -$17.95 ISBN 0-03-000187-0

Fred Blechman, an excellent writer who is no stranger to Computer Shopper readers, has written this guide to the Sanyo MBC 550/555 Computer. Since this system is so extensively advertised and covered in this magazine we were very interested in reviewing this book. Blechman covers all that a neophyte should know about the Sanyo, or indeed any computer that a first time user might buy. He gives numerous programming examples in the coverage of Sanyo BASIC and throughout the book to illustrate his text. His coverage of Sanyo Color and Graphics is excellent and much more complete than most beginner books I have seen. Most of his advice is valuable and easy for a beginner to understand.

I find Blechman's recommendation of peripherals to be very strange. He recommends Sanyo printers (which is natural for this book), but then discusses some printers that are not even available from normal trade channels. While he does include the Star line, he ignores such other standards as Epson, Okidata and Mannesmann-Taley. In the field of modems he really does the reader a disservice by dismissing the subject with "Since this is not a book about modems I'll just cover the ones I've used with the Sanyo MBC550." He then covers only the Radio Shack IB and the Signalman Mark XII. While these are not bad modems, the fact is that most of the best communications software written for MSDOS expects modems that are Hayes compatible. Blechman never mentions the name "Hayes" or indicates that this is a de facto standard in the industry.

The Sanyo MBC 550/555 Beginner & Intermediate Guide in spite of these few adverse observations, is an excellent starting point for beginners and I would urge any of them to buy this book. While everyone has a different idea of the technical level of an "intermediate user," I would not say that the scope of this book extends too far into the range of "intermediate user." For advanced users who are interested in the Sanyo MBC 550/555, the most valuable part is the Appendix where Blechman does list MSDOS software that has been tested to run on this machine and sources for add-ons.

Reviewed by Rich Fields. ●

Hardware of Sanyo
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Motors in the 5.25" drives although high rate of acceleration and long life are highly desirable characteristics for the drive application.

Long Living DD Motor

In contrast, the Direct Drives have a very long life. The DDs usually outlive any other types of motors if their bearings were not damaged by accidents or somehow mishandled. They should last an average life of 10,000 operating hours. There is a good reason for this. The motor operates at a very low power. For 5.25" drives you need a minimum of 400 gr/cm of torque. From 15 gr/cm to 225 gr/cm during operation depending on the disk pack, which averages out roughly to about 150 gr/cm plus or minus 50% when the head is engaged. The actual load varies widely because it is affected by so many factors, such as bearing torque, the surface condition of the disk and lubricant used, the construction of the disk jacket, the configuration of the heads and their materials and head pressure, etc., etc. This relatively low power requirement and absence of the cummutator and brushes result in low heat generation and operation of bearings at near room temperature is possible. The only drawback of the DD Motor is its poor rate of acceleration when starting.

AC Operated Cousins And Lifetime Lubricated Bearings

This means much longer life for the Direct Drive Motors than the hot running AC operated cousins which typically need replacement of bearings every 2,000 hours to 6,000 hours of use, depending on the design of the motor and lubricant used, or 5 years whichever comes first. When bearings start to make rumbling noises it is time to replace them, or lubricate them if you so choose. The so called 'lifetime lubricated bearings' actually means that the manufacturer expects you to replace bearings when the lubricant fails. That is the life of the lubricant and that is the life of bearings. Comprenez pas? You understand that, of course. How convenient for the manufacturers with whom I am currently associated, to say something like that and can bet successfully on the public technological knowledge. I have some doubt that this feat is possible only in this country among all other developed countries in the world.

If you have owned the Shugart 8 inch drives you might have noticed that their motors run pretty hot even with the built-in fan on the output shaft. They use a type of motor called Capacitor Started, Capacitor Driven Motors, the rotor of which is known to run hot with eddy current generated in the cast rotor. These motors demand somewhat frequent lubrication, or replacement bearings, in shorter intervals than DD Motors.

The Sanyo Has Been Designed With Ten Year Use Life

If your disk drives have a Direct Drive Motor, you can run it continuously if you wish, without concern with the life of your drive. The motors in drives should last ten years if the lubricant holds up that long. If you use your drive two hours a day, ten years of use calculates to about 7,304 hours of use. If you have an AC Motor in your drives like many of the old 8 inch drives, you may expect to service bearings at least once in five to ten years of use before it finally becomes an obsolete adjunct. If you have a brush type DC Motor, you should turn-off the motor when the disk is not accessed to conserve the built in limited life. The Sanyo is said to have been designed with ten year use life. Is ten year use life good enough? Not many computers had the honor of receiving ten years of faithful use. It is a very rare case for a computer. You can name more than a dozen once well known and popular computers which became things of the past in less than three years since their debut with a loud fanfare sometimes ornamented with a red rose in a small, slender white vase or prismatic reflections of sunlight in distant rain drops, or with a bird of prey which was the them of the well-known poem by a 19th century Englishman, which included the phrase, "like a thunderbolt he falls." All these machines disappeared after dispensing millions of dollars of advertising money in public media and yet they have sunken down into the quicksand of obsolescence ever so quickly that you hardly believe your own eyes. How many computers can you name that you are quite sure will be sitting on the user's desk ten years after purchase? Can you honestly say that the S-100 machine produced today will still be in use in the year 1994?

We shall discuss techniques of salvaging bearings, coils, other hardware parts, swap ping of motors, repairing pc boards, et cetera in the coming issues of this, now famous magazine with a funny name, in the form of a newspaper which is not it, but we should continue to discuss some immediate remedies for the troubled.

Case of Omitting "Motor-On" Signal By IBM

As I said before, and tell you now, that I bet your trouble probably comes from the selection of options if you have troubled drives, as is the case with the IBM COMMAND.COM for DOS 2.10. This is in fact a problem of how to set the right options on your drive. This option selection is the "public enemy number two." It has interactions and reactions unless the selection just matches the hardware and their environment. In this case of "motor-on" signal omission by IBM, whether intended or not intended, it certainly confuses people. However, with Direct Drive units you can overcome this problem very easily, if you know how to set options to let the motor run when the drive is selected, if the BIOS tolerates the start up time, or runs the motor continuously (whether the drive is selected or not). You now also know why you can't do it with a drive with a DC Motor. We will also discuss the topics of options on the drives in near-future issues of the **Computer Shopper**. These discussions will be universally applicable to whatever computers you might have besides the smart Silver Box. Discussions of options on the drives may take a couple of issues. But, first, we must explore the types of problems we should expect when you buy a drive and install it in your computer.

Track Alignment And 96 TPI Drives

The third and most frequent problem with a new drive is head alignment. This is a particularly acute problem in the 96 TPI drives because of the narrowness of the track on the disk. It is only 10.4 milli-inches between the tracks on the 96 TPI drives. (I erroneously mentioned 10.4 micro-inches in the last issue.) I found that maximum 2 milli-inch deviation to either side of the track did not produce errors most of the time. That is about 0.36 degrees shift on the stepper shaft. You must keep the head position well within this error margin at all tracks. The reason why the head comes off the track can be any of the following: temperature cycling, vibration or shock, or both, or the manufacturer, the manufacturer of the stepper or the manufacturer of the drive. I doubt some manufacturers may use different standards setting the tracks, whether advertently or inadvertently. However, the worst disaster comes from the rejects of step accuracy.

I recollect hearing rumors that at one time IBM had returned a rail car full of drives to a manufacturer. Later, I heard from my engineering friend that they had step accuracy problems in the stepper. Can you put the two together? Yes, you can! That means track alignment problems. In other words, you cannot align the head. There is no way possible to set it right if the step accuracy is the real problem. These drives have a built-in, permanent track delinquency.

When you use 96 TPI, quad density drives, the head alignment on the drive is particularly important. You must make sure the head is positioned right on the mark or nearly so before you start using the drive. The reason for this is that once you have formatted and put the files on the disk using off-alignment drives, you cannot transport the disks to other drives nor can you repair the drive until after you have copied all the files to other disks using properly aligned drives. Simply because if the head position was way off when the record was made, you cannot read the tracks on the corrected drive.

The physical position of track number 0 on the 48 TPI disks must coincide with the track 1 of the 96 TPI disks if you want to read 40 track diskettes on your 80 track drive in the future, although I know some people who prefer to align track zero to track zero. I have tested two 96 TPI drives I bought from a mail-order dealer regarding this track position and none of them were squarely on the track. I had to make a slight adjustment so that the drives read fine on the 48 TPI disks.

If you do not care to read 48 TPI disks and files produced on other 80 track drives, you needn't take the above arguments too seriously. All the disks formatted by a drive should work well on the same drive without regard to track alignment problems. But, knowing possible cause of problems may save you a lot of time in the future.

How To Read 48 TPI Disks On The 96 TPI Drives

The task is fairly easy. What the CPU should know is that you have placed a 48 TPI disk is the 96 TPI drive, then CPU should add one extra step-in signal for each step it takes to get to the target track, plus one for the offset if you are starting from home position. For instance, to get to hex 18 from track 0, it needs 24 steps plus 24, plus 1 for the offset if the travel is from the home position, the total of 25 additional step-in commands are required. As you can imagine it is a simple routine in which you let the CPU calculate the difference between the two positions, the one on which the head is currently sitting on and the target track. Now you have two approaches to do it. One is to step the head the number of different times but without track-updating in track register, then issue the seek command to the disk controller. The head will be brought onto the right track in normal seek operation stepping through tracks and non-tracks. The other is to step the head whatever times it takes to get to the target track, then fill the track register with the target track number and issue seek or read/write command. Both approaches will work equally well but I prefer the latter approach since the stepping time can be controlled independently from the standard setting given by the DOS software. The timing can be accomplished by a little timing loop between the step commands.

Oneway Ticket To The Heaven

Did you ever go to heaven? I didn't mean New Haven. What I meant is the old, paradise kind. Nobody has ever come back from there but it is supposed to be an ultimately nice place. It's indeed like a heaven using quad density drives. But never, I mean, never put a 48 TPI disk in a 96 TPI drive and start Wordstar (even if your software allows it.) When you load the file from Wordstar it automatically creates files and puts them in the directory. This, incidentally, involves some writing operation, of course, and the disk goes to heaven.

Writing anything on a 48 TPI disk using a 96 TPI drive creates irreversible 96 TPI records in 48 TPI tracks, an odd combination which can be read by the 96 TPI head only. Since the new records are sandwiched between the old 48 TPI records on the 48 TPI tracks, the 48 TPI head passing this track produces a jumbled head signal, reading both records, which are not identical, at the same time. This means the disk cannot leave 96 TPI environment, which means that the disk remains in quad density heaven forever unless someone invents a resurrection drive putting 48 TPI head on one side of a 96 TPI drive. This drive may need just one more special function to function properly. Can anybody guess? I would be very curious as to how many of you can come up

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ATARI

Applying The Atari

by Jeff Brenner

In store for this month is a routine for using a numeric keypad, some much needed info of PEEKs and POKEs on the XL, and a printer utility called *ATASCII Lister.* But first, let's look at some readers' questions...

Reader Mail

Q. I have recently become the proud owner of the Atari 800XL, an Atari 1050 disc drive and an Okimate 10 printer. I purchased the Synapse series, *Syncalc, Synfile* and *Syntrend* and this is where my problem lies. My Okimate 10 printer will not print the graphs in the *Syntrend* program. Mechanically the printer is sound but apparently it is incompatible with the program.

Although Okidata has not responded to my questions, Synapse has told me "You can print your graphs on the Okimate if you use a screen dump program for the Okimate that works with Graphics Mode 8 disk files—possibly available from Okidata." I called Okidata and they have never heard of "Graphics Mode 8 disk files" and neither have I. However, in an advertisement I did see an ad for "Printwiz" which seems to be what I am looking for, but I am not sure. Is this the answer or is there something else, and if there is what is it?

Robert Lavoie
Chicopee, MA

A "Graphics Mode 8 disk file" is the data of a Graphics 8 screen which has been saved on disk. Therefore, to print *Syntrend* graphs, you can save the screens to disk and then use a dump program to print the disk files.

While *Printwiz,* ($29.95 from Allen Macroware, P.O. Box 2205, Redondo Beach, CA 90278, 213-376-4105) is advertised to work with Okidata printers, this does not necessarily mean it is compatible with the newer Okimate printers. Remember, Okidata makes and has made many other printer models besides its new Okimate color units. To find out for sure, I contacted Jerry Allen of Allen Macroware. Allen said that the program seems to work with the Okimate 10 and 20, although it was not specifically designed for those units. He assured me that a fully compatible version would be available by May (1985), which means it should be out by the time you read this.

If you decide to purchase this program, I suggest you enclose a note with your order describing exactly what you need it for: printing the graphs from *Syntrend* on an Okimate 10.

I have requested an Okimate manual from Okidata and hopefully I'll be able to publish a Graphics 8 disk file printer dump in a future column. If you can't wait, though, *Printwiz* looks like it should help you. In addition to its screen dump capability, the program offers several other useful features.

Q. I'm new to Atari and to *Computer Shopper* and it's good to have published resources and personal replies to questions. One question that may be useful to all your readers: For those of us who have invested in the Atari touch tablet (for its more appropriate features for the Atari, as opposed to the Koala), we now find there is no new software (despite earlier rumors) and there are no published listings for incorporating it into our BASIC (or other) programs. How can I program the Touch Tablet into my own programs and other graphic modes? It would be extremely useful if the touch tablet could be made to work with graphics software such as Reston's *Movie Maker* and Epyx's *Fun with Art.* Is it possible to do this with the touch tablet?

Lattie Smart
Havre de Grace, MD

Q. I was wondering if you know the code of an Atari touch tablet. For example, a joystick code is A = STRIG(0). Could you please give information on the touch tablet code?

Charles Flanders
Ottuma, IA

The touch tablet can be read as if it were two paddles, with PADDLE(0) and PADDLE(1). As you move the stylus horizontally over the pad, PADDLE(0) changes; vertically, PADDLE(1) changes. The values of PADDLE(0) and PADDLE(1) range from O through 228. When the stylus is removed from the tablet, both values are zero. The touch tablet buttons can be read in a similar manner as they correspond to the paddles' triggers. PTRIG(0) or PTRIG(1) returns a value of zero when the corresponding button is depressed, and a value of one when it is not depressed.

By multiplying or dividing PADDLE(0) and PADDLE(1) and subtracting an offset value from them, you can make the pad "fit" into any graphics mode screen.

Since the touch tablet is an extremely sensitive device, the values of PADDLE(0) and PADDLE(1) will often vary slightly even while the stylus is held at one point on the pad. This same effect occurs with a paddle or a light pen. To compensate for this, you must choose a threshold level of movement, below which any movement is ignored. This threshold level is the least value that PADDLE(0) and PADDLE(1) must change by before the movement is recorded on the screen. This usually involves storing the previous PADDLE values, and then checking them against the new values. For example, if you decide on a threshold of five, you might use a program segment as follows:

```
10 IF ABS(OLDPAD0-PADDLE(0))>=5 THEN GOTO 60
20 IF ABS(OLDPAD1-PADDLE(1))>=5 THEN GOTO 60
30 OLDPAD0=PADDLE(0):REM Did not make threshold; store old
values.
40 OLDPAD1=PADDLE(1)
50 GOTO 10:REM Go back and try again.
60 REM Routine to plot the changes would go here.
```

Lines 10 and 20 check if the difference between either of the new PADDLE values and the corresponding old values (stored in the OLDPAD variables) are at least five. If this minimum is achieved, the plotting is performed. Otherwise, the new PADDLE values become the old values and the program attempts to read the tablet again.

I don't have room this month, but in a future column I'll list a complete touch tablet routine in BASIC.

Regarding the use of the touch tablet with other software, programs not specifically designed for the touch tablet generally will not work with it. The touch tablet is a much more complicated device than the joystick and hence requires a more elaborate routine to incorporate it into software. However, programs which are compatible with game paddles can be used with the touch tablet; horizontal and vertical motion on the tablet correspond to the rotation of the first and second paddles, respectively. This is not to say that the touch tablet can effectively replace the paddles; indeed, in most cases, the tablet will be terribly cumbersome to use in place of the paddles.

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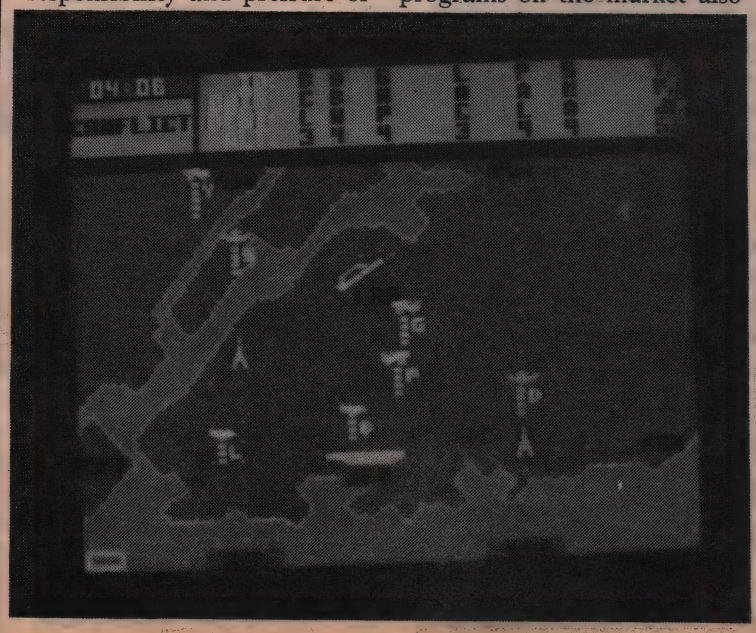
Kennedy Approach

A Review
by Jeff Brenner

So you've always wanted to be an air traffic controller. Probably not, but **Kennedy Approach** lets you come close to experiencing the awesome responsibility and pressure of air traffic control.



New York Air Traffic Screen

It Talks!

Overshadowing all other features of Kennedy Approach is its software-synthesized voice. While several computer programs on the market also "talk," none of them matches the extent or quality of the speech generated by Kennedy Approach. Furthermore, these other games typically use computer speech as a mere enhancement to the existing sound effects, whereas the voice in Kennedy Approach is so superbly integrated into the game play that it is difficult to imagine the simulation without it. The illusion of reality that the voice induces is unbelievable. If you turn down the volume, you have an entirely different game.

Kennedy Approach: The Name

Before I get into the details of the Kennedy Approach, I should first mention that it deserves a better name. Even after you've learned that you're to assume the role of an air traffic controller and not of an assassin, the name "Kennedy Approach" fails to convey the

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Applying The Atari
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TypeSetter Update

In the November 1984 issue of *Computer Shopper* I reviewed *TypeSetter.* I gave it a two-star overall rating (fair), and among my many comments were that users should be able to design their own typefaces and that the program should support the higher resolution modes available on the current Epson, Gemini, and compatible printers. Sure enough, the manufacturer (DataArts Software, P.O. Box 1613, Troy, NY 12181) has released a font editor ($24.95) and a new double-density version of *TypeSetter* ($29.95). If you've already purchased the lower density version, you can get an update from DataArts for $9.95.

TypeSetter offers a variety of additional typefaces (at $11.95 for 5) and has an advantage over *The Print Shop* ($44.95 from Broderbund Software, 17 Paul Drive, San Rafael, CA 94903) in that it can print lower case characters. Therefore, it is better suited for some applications. But for ease-of-use and specific applications such as printing greeting cards, banners and signs, *The Print Shop* is hard to beat.

Numeric Keypad

Many readers took advantage of a recent B.G. Micro advertisement in *Computer Shopper* which offered Atari numeric keypads for $7.95. Considering that the keypad originally sold for over ten times the price, this is a great buy. If you can still get one at this price and haven't gotten one yet...GET ONE! There is a catch, however; no supporting software or documentation is included except for a schematic and a truth table. Fortunately, I'm here to make it easier for you to apply your Atari, and a numeric keypad is often a welcomed convenience when programming. So get out your Atari CX85 Numeric Keypad, plug it into Port 1, enter the program listed under **Program 1**, save it, press SYSTEM RESET, and run it! It is necessary to press SYSTEM RESET at any time before the program is run to properly initialize the joystick port.

When you run this BASIC program, it incorporates a machine language program into the Atari's vertical blank routine, which is executed each time a screen frame is drawn, or 60 times per second. The machine language program decodes any key pressed on the keypad. It then makes the Atari think that the key has been pressed on the keyboard by storing an appropriate value into the keyboard register at location 764. As a result, the keypad functions like your Atari keyboard, except a key pressed on the keypad will not repeat when held down. The YES and NO keys return Y and N respectively, and the +/RETURN key is interpreted as the RETURN key. DELETE is used to back space, and ESCAPE functions like the Atari ESC key.

Once you've run **Program 1**, you can erase it from memory with NEW and proceed with your own BASIC programming. The keypad will be active. If SYSTEM RESET is pressed, it will be necessary to reinitialize the keypad program by typing A = USR(1536).

Program 2 contains the same program except when the YES key is pressed, a comma is printed instead of a Y. You'll truly appreciate this when entering many lines of data statements. With your right hand on the keypad you can type in the line number, use your left hand to type DATA on the regular keyboard, and use your right hand again to type the numbers, commas and RETURN. Next month you'll learn how to redefine any key on the numeric keypad.

PROGRAM 1

```
FMJ 1Ø REM NUMERIC KEYPAD PROGRAM #1
KFJ 2Ø REM COPYRIGHT 1985 JEFF BRENNER
JWJ 3Ø TOT=Ø:FOR I=1536 TO 1607:READ NUM
OOJ 4Ø POKE I,NUM:TOT=TOT+I+NUM:NEXT I
KQJ 5Ø IF TOT=12Ø212 THEN A=USR(1536):END
FBJ 6Ø PRINT "ERROR - CHECK DATA":END
LCJ 7Ø DATA 1Ø4,162,ØØ6,16Ø,Ø11,169
LUJ 8Ø DATA ØØ7,Ø32,Ø92,228,Ø96,174
LAJ 9Ø DATA Ø16,2Ø8,24Ø,ØØ6,2Ø2,134
MWJ 1ØØ DATA 2Ø4,Ø76,Ø51,ØØ6,165,2Ø4
MIJ 11Ø DATA 24Ø,ØØ2,2Ø8,Ø23,23Ø,2Ø4
MJJ 12Ø DATA 173,ØØØ,211,Ø41,Ø15,17Ø
MBJ 13Ø DATA 173,ØØ1,21Ø,2Ø1,ØØ1,24Ø
NCJ 14Ø DATA ØØ2,162,Ø16,189,Ø54,ØØ6
NLJ 15Ø DATA 141,252,ØØ2,Ø76,Ø98,228
NAJ 16Ø DATA Ø52,Ø24,Ø29,Ø27,Ø35,Ø51
MWJ 17Ø DATA Ø53,Ø48,Ø43,Ø31,Ø3Ø,Ø26
NMZ 18Ø DATA Ø5Ø,Ø34,Ø12,Ø14,Ø28,155
```

PROGRAM 2

```
FNJ 1Ø REM NUMERIC KEYPAD PROGRAM #2
KFJ 2Ø REM COPYRIGHT 1985 JEFF BRENNER
JWJ 3Ø TOT=Ø:FOR I=1536 TO 1607:READ NUM
OOJ 4Ø POKE I,NUM:TOT=TOT+I+NUM:NEXT I
KOJ 5Ø IF TOT=12Ø2Ø1 THEN A=USR(1536):EN
FBJ 6Ø PRINT "ERROR - CHECK DATA":END
LCJ 7Ø DATA 1Ø4,162,ØØ6,16Ø,Ø11,169
LUJ 8Ø DATA ØØ7,Ø32,Ø92,228,Ø96,174
LAJ 9Ø DATA Ø16,2Ø8,24Ø,ØØ6,2Ø2,134
MWJ 1ØØ DATA 2Ø4,Ø76,Ø51,ØØ6,165,2Ø4
MIJ 11Ø DATA 24Ø,ØØ2,2Ø8,Ø23,23Ø,2Ø4
MJJ 12Ø DATA 173,ØØØ,211,Ø41,Ø15,17Ø
MBJ 13Ø DATA 173,ØØ1,21Ø,2Ø1,ØØ1,24Ø
NCJ 14Ø DATA ØØ2,162,Ø16,189,Ø54,ØØ6
NLJ 15Ø DATA 141,252,ØØ2,Ø76,Ø98,228
NAJ 16Ø DATA Ø52,Ø24,Ø29,Ø27,Ø35,Ø51
MUJ 17Ø DATA Ø53,Ø48,Ø32,Ø31,Ø3Ø,Ø26
NMZ 18Ø DATA Ø5Ø,Ø34,Ø12,Ø14,Ø28,155
```

SELECTED PEEKS AND POKES FOR THE XL

PEEK/POKE	LOCATION(S)	NAME	VALUE=EFFECT/MEANING
PEEK/POKE disabled.	621	KEYDIS	55 =Keyboard use 0 =Keybard use enabled.
POKE	622	FINE	255=Prepare for fine scrolling. 0 =Prepare for normal scrolling. Takes effect after GRAPHICS 0 command.
PEEK/POKE	731	NOCLIK	255=Keyboard click disabled. 0 =Keyboard click enabled.
PEEK	732	HELPFG	17 =Help key pressed. Clear with POKE 732,0 after reading.
PEEK/POKE	756	CHBAS	224=Normal character set. 204=International character set.

"Table 1"

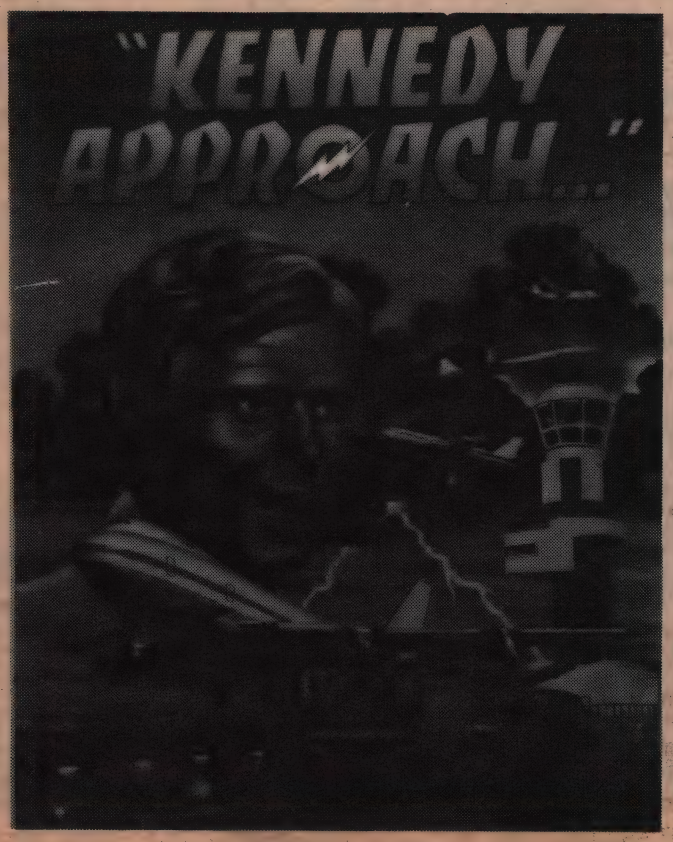
XL Pokes and Peeks

As I promised last month, I'm including a list of a few PEEKs and POKEs unique to the XL. **Table 1** shows whether the location is generally PEEKed or POKEd, the values to POKE and their effects or the meaning of values which are PEEKed. We'll get into the more complicated PEEKs/POKEs in future months.

ATASCII Lister

Listing BASIC programs to the printer can present a problem to the programmer, especially when the program is written in Atari BASIC. The

Continued on page 140



Kennedy Approach
Continued from page 57

thrill and realism of the simulation. Additionally, the name refers to only one of the five airport areas that you can choose to control, the New York area, albeit the John F. Kennedy International Airport is probably better known than the others, such as Atlanta's William B. Hartsfield Airport. Nonetheless, the Kennedy airport simulation, in which you control air traffic for both the Kennedy and LaGuardia International airports, is the most difficult of the five, and consequently, the option you'll probably play the least.

Well, it's too late for MicroProse to do anything about the name, so let me air one more peeve: the "computer access code." Each time you load the game, a number is printed on the screen. You must look up this number in the instruction manual to find the corresponding password. Typing the correct password will let you play the game, otherwise you're subject to watching the demonstration mode. While this look-up password system was intended to thwart software pirates, it is a nuisance to have to fetch the booklet each time you want to play the game. And if your method of storing software manuals is anywhere comparable to mine, you'll be lucky enough to even **find** the booklet when you need it. I must give some credit to MicroProse, though, for making at least one improvement since implementing the password scheme in its F-15 Strike Eagle simulation: The codes printed in the Kennedy Approach booklet have been enlarged to the point of readability. The microscopic print appearing in the F-15 Strike Eagle manual was difficult to read without a magnifying glass.

If Kennedy Approach were anything less, I would make this code business an even bigger issue, but fortunately (for MicroProse) the game is good enough to partially warrant the inconvenience.

Kennedy Approach: The Game

At the start of the game you choose one of five skill levels. Depending on the level you choose, you are given a listing of up to five cities, each with a particular work shift. You can select one of these cities to work in. Of the five cities, the easiest work is found in Atlanta, Georgia, at the Hartsfield International Airport. Here, the surrounding terrain is flat, the weather is ideal, the number of arrivals and depar-

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TEXAS INSTRUMENTS

Randy's Ravings

by Randy Holcomb

This month we will look at terminal emulators and our usual tour around the TI world.

Since the demise of the 99/4A the only way to talk to the outside world with your computer consisted of using the Terminal Emulator II cartridge from TI. The TE II cartridge provided the normal functions of a communications program (setting line speeds, baud rate, parity, etc.) but also provided some rather bizarre features that I have not seen any other terminal emulation program perform, such as speaking text. Through the use of the speech synthesizer attached and through a series of special characters your computer can actually speak the text as it comes down the line. Also, the TE II can produce musical tones and perform cell-oriented graphics (similar to Basic's graphics) all with just the TE II cartridges and the proper coding.

Well, for all its power little of it is being used in the many BBSs and the commercial networks. Most TI BBSs have used the speech capabilities and will even change your screen color but that's about it. Also, TE II has some annoying problems: the one that got to me the most is if you type too fast you sometimes lose the first character of the new line. Another limitation is its rather crude method of saving text from the session a screen at a time. On most commercial services you typically use a control -S to stop the computer from sending any more text and a control-Q to resume the flow of output from a computer. Then you have some BBSs out in the field where sending ANY character aborts the transfer! This is where having a large buffer (a place to hold text) is very welcome. Now, after many years of suffering at the hands of TE II we have many new terminal emulators to choose from.

Terminal Emulator Wish List: After talking with a few people we came up with a list of features that would make the IDEAL terminal emulator. Some of these features we will mention already exist in some emulators (though not necessarily for the 99/4A). The features are:

* A reasonably sized capture buffer to handle all incoming text
* Ability to handle high transmission rates (1200 bps, 2400 bps, etc.)
* Ability to route output to a secondary device (printer, disk) in REAL TIME (same time we are receiving the text)
* Ability to emulate different kinds of terminals (ADM-3a, VT100, etc.)
* Ability to create and use a dictionary that contains the names, numbers and parameters for systems that the user calls
* Ability to include a "script" file which allows for "hands-off" use of the emulator
* FULL support of the Hayes command set for intelligent modems
* Support for multiple file transfer protocols (TE II, XMODEM, Kermit, CompuServe A/B, etc.)
* Ability to enter a split-screen mode for use in real-time conferencing systems (so what you type in doesn't get mixed in with what comes over the screen)

Now, for as unrealistic as these items sound, many of the emulator programs for other systems have a LOT of these features. So, why shouldn't we have some of them? Well, we have some, but it's going to take some more work.

Right now there are two terminal emulator programs that are being used heavily as replacements to the TE II: TE3 (and its offshoots), and FastTerm. TE3 is "public domain"; FastTerm is a "Freeware" product (pay for it if you like it and use it). We will look at TE3 and FastTerm in this article; I would like to encourage others who use any other terminal emulator package to describe the emulator and their uses for a possible emulator comparison column.

TE3: TE3 came out of nowhere and began circulating on the BBS scene, with many modifications being made to it to enhance its usability. Many have incorrectly called it an "unfinished" upgrade for the TE II but this is not the case; in fact, some of the early versions clearly give you the impression that this is not the case, when in actuality, it was an emulator written in-house by a TI division. Some of the many changes made to it have included a large capture buffer, ability to send ASCII files (Display/Varibale 80) over the line, and a true lowercase character set. The most recent version implements the ADM-3a control codes. TE3 also implements 40/80 column screen mode (with no word wrap) and an auto-dialer facility that uses pin 5 off the RS232 port as input to a relay that does the dialing. TE3 represents the first generation of emulators that makes a dent on some of the features we'd like to see, but it does have its drawbacks: its biggest one is that it can't handle 1200 bps and above well - it likes to drop characters especially during a scroll. If you need an emulator to do high-speed, check it out before you buy - the parameter may say 1200 bps but may not run reliably at it! TE3 can be found on most TI BBS systems and can be found in the TI Forum DL3 database on CompuServe. TE3 requires the Editor/Assembler package plus 32K expansion memory and disk.

FastTerm: FastTerm comes to the TI world from Paul Charlton, a student at RPI in Troy, NY. The initial version had problems with my system configuration as his copy-protection scheme died when it ran afoul of the CorComp controller card. Also, early versions were heavily dependent on using TI-only peripherals and their special I/O hooks buried in the peripheral DSR. Luckily, Paul has included third-party peripherals and has abandoned copy protection and distributes FastTerm unprotected, and if you can read double-sided and/or double-density diskettes Paul will provide the source code for the emulator as well (if you ask for it).

FastTerm has a number of features going for it: 40/80 column windowing, capture buffer, real-time routing to a printer (RS232 or PIO), support for up to 19.2Kbps (if you need to hook up to a computer that can spit out that fast!), ASCII file upload, and the latest release will handle TE II transfers. Another neat feature is the ability to freeze the screen contents and print the screen while it's receiving data from the host. Once printed, you can pick back up into the flow of text. Like TE II, you can page through text stored in its screen buffer at high-speed, with a large horizontal bar separating the start and end of the screen buffer.

(The current TE II transfer in FastTerm has a problem that affects users of TE2TRN on CompuServe and TI-West BBSs for downloading: FastTerm expects a CR to be followed after the initial start-up block transfer on a download from a host to the remote. TIBBS Systems send the CR so downloads from TI BBSs will work, even though the protocol manual states that the CR isn't needed at the end of that packet. By the time you read this that bug should be fixed. There are NO problems using FastTerm to upload.)

FastTerm gripes: If I have to fault FastTerm for anything it's for some of the mapping of its function/control keys (a few to memorize!); also one thing that I would like to see is the ability to freeze the output from the host when its buffer gets full and have the program automatically dump its output to disk/printer and continue on after it has completed dumping its data. Right now FastTerm chimes (like the chime example in the E/A manual!) and tells you that your buffer is full. FastTerm's buffers aren't as big as TE3's but should serve adequately for most purposes. One nice thing that I found to be quite symmetrical with the rest of the /4A environment: FCTN 4 in FastTerm sends the BREAK code (versus the CTRL/ in TE II) which acts as a CLEAR in most of the other /4A uses.

Summary: We got quite a

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The Art of Negotiating Now Available For The Data General/One and GridCase Computers

Roy A. Nierenberg, President of Experience in Software, Inc., the developer of **The Art of Negotiating** software, has announced that the program is now available in the 3-½-inch disk format that runs on the Data General/One and GridCase computers.

"We recognized a growing need for The Art of Negotiating software in this compact format for these easily-portable machines," Nierenberg commented. "Executives and key salesmen involved in negotiations away from their home offices will discover the usefulness of having the program available as a preparation tool in these long-distance negotiations. Of course, they can also use the program from their home base. Additionally, we foresee that the software will be valuable in this format to trainers who may be teaching seminars at satellite offices."

The Art of Negotiating software can be a valuable preparation or training tool for the executive, whether he or she is involved in average or complex negotiations. In an easy-to-follow, plain English format, it takes the user through the negotiation process, using as its model a negotiation that the user determines.

The Art of Negotiating software requires 256K memory, and has a suggested retail price of $495.00. In addition to the Data General/One and GridCase machines, The Art of Negotiating software is available in 5-¼-inch disk format for the IBM PC and compatibles. Inquiries and orders should be directed to Experience in Software, 2039 Shattuck Avenue, Berkeley, CA, 94704. Telephone: (415)-644-0694.

Mention that you read about it in the *Computer Shopper*. ●

Randy's Ravings
Continued from page 59

way to go to achieve THE emulator for our needs, but with programs like TE3 and FastTerm we may achieve that goal soon. I know that there are other emulators on the market. The reasons for my not mentioning them here is either because of lack of first-hand experience (like PTERM, AMALINK, TE-1200 and 4a-TALK, to name a few) or I just don't know about them yet. But with the rage of Freeware and public-domain programs reaching a fever-pitch in the TI community (and a lack of effort of the part of companies to produce software for the /4A) this is a perfect showcase of what USERS' efforts can provide. To Paul Charlton and the many individuals who worked on TE3, our hats are off to you.

Other TI News: We hope to have a report from the Summer CES on any new products for TIs in the next column, with hope that the "mystery" upgrade for the 99/4A shows up at the show for inspection.

TI Professional Users: If you're out there let us know! If you have a Pro and are playing with a new piece of software drop us a line and let us know what you think of it!

Next Month: More from the TI World.

FastTerm
Paul Charlton
1110 Pinehurst Ct.
Charlottesville, VA 22901

Suggested Donation: $10.00 and return postage and your disk ●.

KnowledgeMan Is First Integrated System To Offer LAN Version

Micro Data Base Systems, Inc. (MDBS) has announced a local area network (LAN) version of its best-selling KnowledgeMan package for integrated knowledge management. KnowledgeMan is the first integrated software to be offered in a network version.

KnowledgeMan is a state-of-the-art knowledge management system that integrates a relational data manager, a third-generation spreadsheet, an English-like query language, programming language, and more. Optional components are available for on-screen forms painting, color graphics, text processing and mouse handling.

According to Dr. Gary Koehler, MDBS Chief Executive Officer, KnowledgeMan provides the highest level integration of its functions - including its optional components. "Users can freely intersperse various commands and functions and even combine spread-sheet oriented

Continued on page 186

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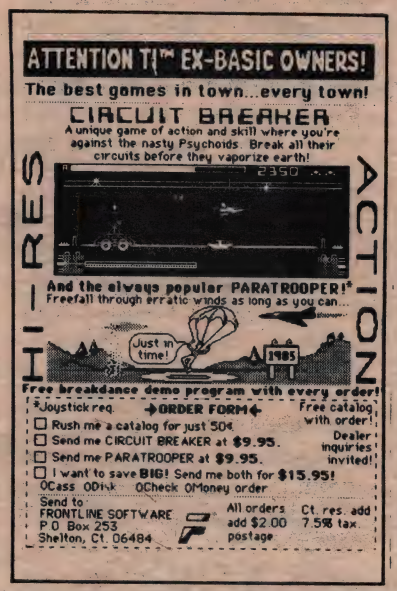

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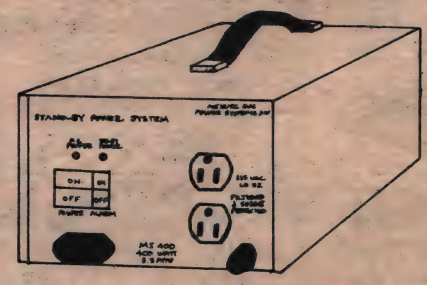

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HEATH/ZENITH

What? A Heath CP/M Computer For Fifty Dollars?

...Well, Sort Of...The H-89 At Age Six, "For a Few Dollars More..."

by George M. Ewing

Well, all right, the price quoted up in the title is an attention-getting gimmick, but a perfectly legitimate one. The current catalog price (Spring, '85) for the Heathkit H-89 is $599. However, when you buy an H-89, you also get an H-19 terminal in the same rugged, grey box. The H/Z-19 is one of the most popular terminal designs ever, and many users like it better than the new terminal that replaced it, the H-29. The H-29 in kit form lists for $549 in the same catalog. Hence, the logical rationale for the title statement above: If you should happen to be in the market for a good terminal anyway for something like the information services, bulletin boards, MCI-Mail, etc., you might want to consider getting an H-89/H-19 instead. For fifty dollars more, you get a 48K Z80 computer easily upgradeable to 64K, a disk drive controller, and a built-in 100K disk drive.

Granted, you'll still need to acquire an operating system. You'll probably have to lay out a few dollars for a serial I/O card, and perhaps a second disk drive. Still, assuming you need a terminal anyway, you can probably get a pretty nice system up and running for less money, and certainly a lot less trouble, than you could by building up one from scratch with the various single board computers advertised by surplus dealer. This is especially true for the less-experienced hardware hacker, as the Heath CPU motherboard and TLU terminal board come preassembled and tested, and the manuals are probably among the best anywhere in the electronics industry, let alone hobby computers.

If you aren't about to shell out five or six bills for a terminal under any circumstances, you might still want to consider a good used H-89, or a used H-19 that can be upgraded. As many H-89 users are beginning to upgrade their systems with a DG-Super-89 or TMSI H-1000 CPU board, good used CPU boards are coming on the surplus market for less than two hundred dollars, even including the cost of a new set of ROMs. New 4116 DRAMs for a 64K memory upgrade are now less than fifty cents on the surplus market; check the ads in the back of **Computer Shopper** as well as the Heath/Zenith specialty magazines. Likewise, other spare parts like disk controllers and keyboards are getting quite cheap.

Why would a hobbyist want to buy an H-89, even a bargain one, instead of the new, "Pacific Basin Beige" MS-DOS machines, or even one of Heath/Zenith's own fine H/Z-100 or 151-161 series IBM-lookalike machines? Well, if you absolutely MUST have an IBM clone, then either the H/Z-100/150 series or an '89 upgraded with a TMSI board is probably just the ticket. It depends on what you intend to DO with your computer. For many applications, an 8-bit machine, especially a Z80 machine with CP/M capabilities, is more than adequate, and may even be more suitable. Consider: The basic 1979 H-89 design is now coming up on six years old. It is what is called a "mature technology" in the industry. It isn't quite obsolete yet, despite jeers from the chauvinistic beige-boxers, but has been around long enough that all the bugs are out of the original design, some nifty upgrades and improvements have come along, and enough machines have been sold that a wide support base of users, interest groups, and third-party vendors of software, aftermarket hardware, and accessories have developed. Also, the economies of scale from volume production and competition from new generations of machines have forced the price down: the H-89 costs about a third of what it did when it was first introduced, even less in constant 1979 dollars.

Take operating systems, for example. There are four kinds available for the H-89: HDOS, CP/M, UCSD Pascal P-System, and several versions of standalone FORTH, plus various improved and "Turbofied" variations. For at least two of these, FORTH and HDOS, source code is readily available, and CP/M has been around so long that a tremendous amount of free public domain software is available, as well as a wide selection of commercial languages and applications programs.

Third-party hardware support is just as plentiful as the software. You need only to skim through the magazines to find ads and reviews of all kinds of new options, additions, and improvements. If you are not satisfied with all the different hard-sector, soft-sector, eight-inch and Winchester disk configurations available from Heath/Zenith, there are dozens of firms offering various add-on and retrofit disks, controllers, and software to drive them. Not satisfied with three expansion slots? Boards are available for five or even seven. Need another parallel or serial port, real-time clock, pseudo-mouse, 4-MHz speed-up, or other technical improvement? You can take your pick from various competing vendors, or build it yourself from construction articles in the magazines. There are even replacements for the entire CPU board itself that allow adding more memory beyond 64K or even a whole new 8086 computer. The H-19/H-89's display is superb for word processing or other serious computing, but the 33 8 x 10 H-19 graphics characters and their reverse video reciprocals are rather limiting; high resolution monochrome or medium resolution color graphics upgrade boards are readily available from more than on vendor.

It is hard to overstate the value to the hobbyist of Heath's "We won't let you fail" documentation. Take my own system as an example. I was trained as a high school English teacher, not an engineer, and while I have a ham license and some experience with kit building, I'm a long way from being an expert service technician. A week ago, after four and a half years of daily use and having been dragged all over the country on trains and in the back of an old van and pickup truck, my trusty grey box finally failed. One minute I was happily typing along on a science fiction story about a biological menace destroying the state of Florida, and the next there was a "kerchunk" and the H-89 went bonkers, ate the system disk, and died.

Having put the system together in the first place gives the average H-89 user a lot

Continued on page 62

7388A Double-Density DMA Controller Card Addresses Up To 1M Of Memory

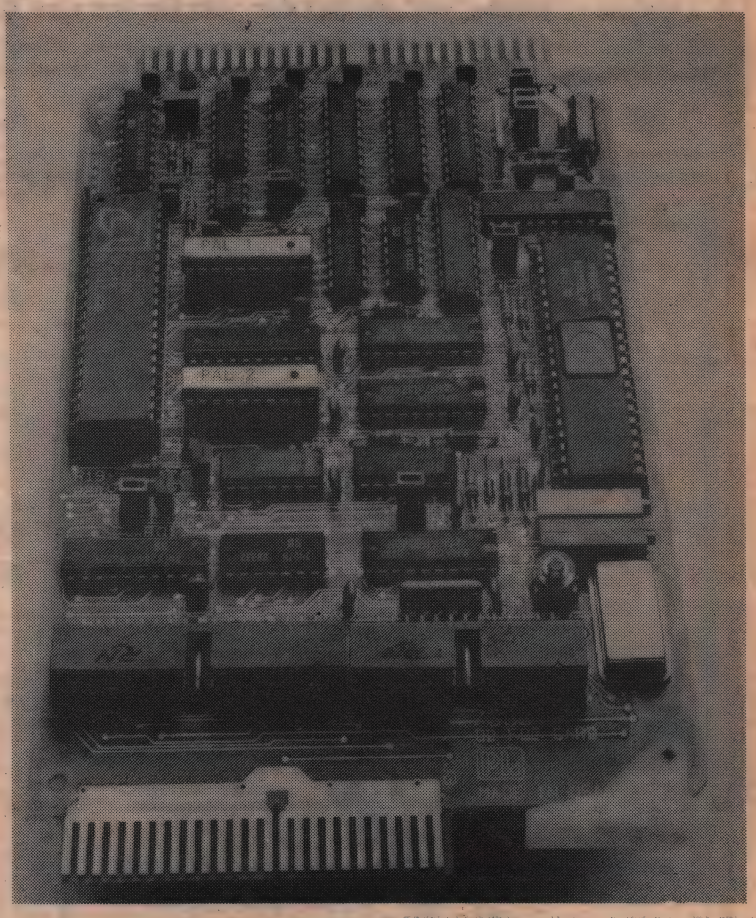
Designers of STD BUS systems requiring flexible floppy disk storage will find Pro-Log's new 7388A controller card offers fast memory access and data storage in double-density disk format, while addressing up to 1M of memory for use with 16-bit CPUs.

An on-card DMA (direct memory access) controller frees up the central processor unit for other activities. With three channels available to the system engineer, Pro-Log's new card enables high-speed memory-to-memory.

The 7388A can interface with 8-bit systems based on Z80, 8085, 6800 and 6809 processors, addressing 64K of memory via DMA and decoding an 8-bit I/O address. The card also supports 8088-based systems with DMA access to 1M of memory and the ability to decode up to 10 bits of I/O address.

The 7388A controller supports any combination of up to four floppy disk drives in 3-½, 5-¼ or 8-inch formats. Soft-sectored, single or double density, and one- or two-sided disks can be accommodated by the Pro-Log card.

Two popular LSI devices, the 2793 intelligent floppy disk controller and the 8237A four-channel DMA controller, are designed into the 7388A. Data



transfers between the card and system disk drives are handled by the 2793 floppy controller, while the 8237A DMA controller device transfers data between the 7388A and the STD BUS.

Complete documentation and control software examples are available for the new controller card. The 7388A is priced at $395. For more information, contact Pro-Log Corporation, 2411 Garden Road, Monterey, CA, 93940; (408)-372-4593.

Mention that you read about it in the **Computer Shopper**.●

3Com, Microsoft Alliance Brings IBM PC Network Compatibility To Dealers And System Integrators

3Com Corp. and Microsoft Corp. have reached an agreement that will provide IBM PC Network compatibility to 3Com's EtherSeries local-area network (LAN) products, the two companies announced.

"We are very pleased to work with Microsoft to offer PC Network compatibility to retailers and system integrators using EtherSeries," said Bill Krause, president of 3Com. "The two companies will cooperate closely to pursue joint customer contacts and sales."

Under the agreement, future EtherSeries network software products will incorporate a portion of Microsoft Networks software called the Redirector. This module, used together with Microsoft's MS-DOS 3.1 operating system, provides IBM PC Network-compatible file and resource sharing across a LAN.

"3Com's adoption of Microsoft software will allow network applications developed for the IBM PC Network to run without modification on future EtherSeries networks," said Steve Ballmer, vice president of operating systems software at Microsoft. "In addition, PC Network-compatible products can be designed in such a way as to take full advantage of EtherSeries' advanced networking features."

Microsoft and 3Com will work together to pursue customer contacts, carry out joint sales, promote product information exchange and provide customer training and technical support.

Since the IBM PC Network and EtherSeries use common software developed by Microsoft, the networks possess a level of application and network compatibility that provides a foundation for further network integration.

3Com Corp., of Mountain View, is a computer communication company that designs, manufactures, markets and supports high-performance local-area network systems based on Ethernet, MS-DOS and IBM PC standards.

Microsoft Corp. manufactures and sells a wide range of software, operating systems, languages, books and hardware for the microcomputer marketplace.

For further information contact 3Com Corporation, 1365 Shorebird Way, P.O. Box 7390, Mountain View, CA 94039

Mention you read it in Computer Shopper. ●

Heath/Zenith
Continued from page 61

more confidence when it comes to repairs. Out came the soldering iron, trusty cheap multi-meter, and about ten pounds of big, yellow, friendly, idiot-proof Heathkit manuals. A brief glance inside the box and two quick voltage measurements led immediately to the trouble-shooting chart. "Aha! It must be bridge rectifier BR-101!" No ambiguous directions in Pidgin English or Nepalese part numbers, just a straightforward chart, with the ratings given in the manual. Any surgeon can always use a second opinion before cutting into a sick patient; a quick call to the FREE technical hotline at a nearby Veritechnology/Heath-Zenith store confirmed the diagnosis: "Yeah, sounds like BR-101."

Six screws and four easily-accessible solder connections later, the new six-dollar part was in place and the system was up and running again, total down time about 3 hours, mostly consumed as drive time to the parts store. Diagnosis, disassembly, and replacing the bridge took only about thirty minutes. None of this foolishness about shipping your computer UPS to some service center in California, no demeaning and humiliating begging and pleading for a schematic over the phone, no sending off fifty dollars in small, unmarked bills to some sleazy publisher's P.O. Box in the hope of getting a pirate technical manual, even a blurry Xerox copy in Japanese, not having to sell your teenaged sister into slavery to get a source listing for the monitor ROM; it all comes free in the box with the computer in the first place!

Will the H-89 keep on going forever? Maybe not quite, but it's still a good many years from the scrap heap. Six years is a long time in the computer industry, but my guess is there's probably at least another six or so left, maybe a good many more than that. Even if the 1985 Heath $599 catalog price really is a "last call," a quick review of the history of the company's other products lends a useful perspective. For example, the venerable "Twoer" and "Sixer" lunch box VHF radios, common in the catalogs when I was a kid in high school, still turn up at hamfest flea markets, and there are many hams still using them on the air evenings on informal AM networks on the six and two meter amateur bands. I sold my old Heath VTVM for twelve dollars my freshman year in college, and 18 YEARS LATER saw the same actual meter on sale at the Dayton hamfest flea market, still working! Other computers, such as the earlier Apples, that were supposed to be obsolete by newer technologies are still very much alive, and while there may be more Apple users than HUGgies, the HUGgies may have a big edge in technical self-sufficiency and organization. At least another five or six years seems reasonable for my machine, and in dollars-per-year of service, that's pretty hard to beat! So, if you're on a budget and in the market for a good new terminal anyway, think about it: for a few extra dollars, you could snare a lot of useful and educational computer hardware. If you aren't one of those fanatics among us who thinks, "Grey is Beautiful," a spray can of IBM beige paint only costs a dollar or two at the nearest discount or hardware store! ●

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MISCELLANEOUS

Why Some Circuits Do Not Work Properly

by Les Solomon

The story is common. You read various electronics magazines every month because you enjoy reading about electronics and reading gives you the great satisfaction of learning how electronic things work. Then one month, you finally find a project you want to build.

Checking the project parts list against the parts you have scattered in various boxes, you find that you have just about everything you need. In fact you may have to buy only one or two low-cost items. So, you take your trusty soldering iron in hand and away you go.

Now the project is finished. You turn it on and start to check its operation. Disaster, this time you discover that for some reason or other the thing either does not work at all or does not work as specified.

The first thought to cross your mind is you have either left something out, or installed something improperly. So you check the circuit against the schematic and find it all there. Now you check each component and find that everything appears okay. While you are at it, you check all soldered connections for proper joints and make sure that there are no solder bridges across any adjacent foil traces. Just one of these very slender and almost invisible shorts will certainly stop operation of a pc board.

The headache starts when you find that the project is the same as the schematic, and all parts appear to be normal. The situation appears impossible.

The big question is: if everything is okay, then why doesn't the circuit properly do its thing?

Obviously, since the project doesn't work there are some differences between the schematic and the physical project, and these differences may be causing the problem. What makes it so hard is that many of these differences may be invisible!

Although space does not permit covering all the permutations in this article, lets discuss some possible reasons why such problems can occur.

Lets start with the passive components - resistors and capacitors. For example, the parts list calls for a 220K resistor, but you have a 200K resistor - close enough. You have a 0.001-uF capacitor, but the circuit calls for a 0.005-uF capacitor - close enough. Okay you may say, so there will be some slight circuit change with the slightly different component values - but, "what the heck" as Kermit the Frog says - this shouldn't stop the thing from working. You know that once it works, it is possible to "tweak" the component parts for optimum operation.

However, if the circuit you are dealing with relies heavily on an RC time-constant, or is associated with a phase-sensitive circuit, always make sure that the values of both the resistors and capacitors are exactly as specified; otherwise, errors will definitely occur.

Speaking of capacitors, especially of the disc variety, how sure are you that they are actually soldered into the pc board? Take a close look at several brand new disc capacitors and note that in many cases, the plastic insulation that covers the body may also coat a small section of the metal leads.

If you drop the leads of such a disc capacitor into their respective holes in a pc board and "solder" them, it is possible that the solder is holding only the plastic in place, and even though the parts look soldered in, the capacitor may not be in the "circuit electrically"!

To avoid this, always scrape the leads of all components shiny and clean before installing it.

Semiconductors

There are two major divisions of transistors. One is a small black plastic thing having three leads sticking out and called a "signal" transistor. The other, called a "power" transistor, is either a metal-cased device usually operated with a snap-on heat sink, or a square plastic thing also with three leads and a large metal "lip," or it is a large metal oval-shaped device with a small "hat" (called TO-3) having only two rather heavy leads (emitter and base) protruding from the bottom (but we know that the metal case is the collector).

Continued on page 64

What's New At Comdex

By Computer Shopper Staff

Computer Shopper attended the Spring 1975 Comdex in Atlanta as an exhibitor and in addition three members of our editorial staff were there as reporters. The most interesting thing to report was that there little new to report except for improvements in peripherals. Few computer introductions are made at shows these days because they tend to get lost in the general excitement of the show. Compaq, Sanyo, AT&T, Olivetti and several others introduced new series of computers to the public, however most of these were merely updates of their existing lines. Although they had significient improvements, in most cases the exhibitors such as AT&T showed machines that had been previously announced to the press, but not seen by most dealers.

Epson's New Printers

Sunday evening we arrived in Atlanta, set up our booth and went to Epson America's preview for the press. We didn't know it at the time but we were getting an advanced viewing of some of the newest machines at Comdex. The new SQ-200 Ink Jet Printer (Fig. 1) is a completely new idea in this type of printer. Formerly ink jet printers needed to use special paper to absorb the ink. This machine can use regular, smooth, commercial bond paper and is dry at the end of each page. The ink is contained in a sealed plastic container for clean hands operation. The SQ-200 offeres a unique self-cleaning system to ensure reliable operation and prevent ink clogging, a real problem with other ink jet printers. The printer automatically cleans the print head every few pages in a one second cleaning cycle. During an extended high volume use, the user pushes a button labeled "Cleaning" to start a ten second ink-line and print head cleaning cycle. The SQ-200 operates at 176 CPS in draft mode or 106 CPS for letter quality mode. The 24-nozzle print head provides high quality printing with 240 dots per inch for graphic resolution.

The SQ-200 is designed to retail for $2,295. The optional tractor feed is $55 and the cut sheet feeder is $499. Epson is also entering the low cost daisy wheel printer market with two daisy wheel printers, the DX-10 at $399 and the DX-20 at $499.

Quadram Quadlaser

Quadram entered the Laser Printer market with the Quadlaser (Fig. 2). This $3,795 non-impact typeset quality printer is the newest entry into the personal computer Laser Printer market. It includes a font editor, seven standard type fonts and all the supplies to make the printer ready for use when purchased. Quadlaser can print up to eight pages per minute, a speed that would translate to about 330 characters per second. The type fonts are contained on a floppy disk and are loaded into the machine. About 20 different type fonts are available at this time. The Quadlaser will accept paper in 16 to 24 lb wights including letterhead, forms and transparencies. It will store 250 sheets in a cassette and has a 250 sheet face-down sequenced output capability. Compared with other laser printers which have 100 sheet capacity and 50 page

Continued on page 146

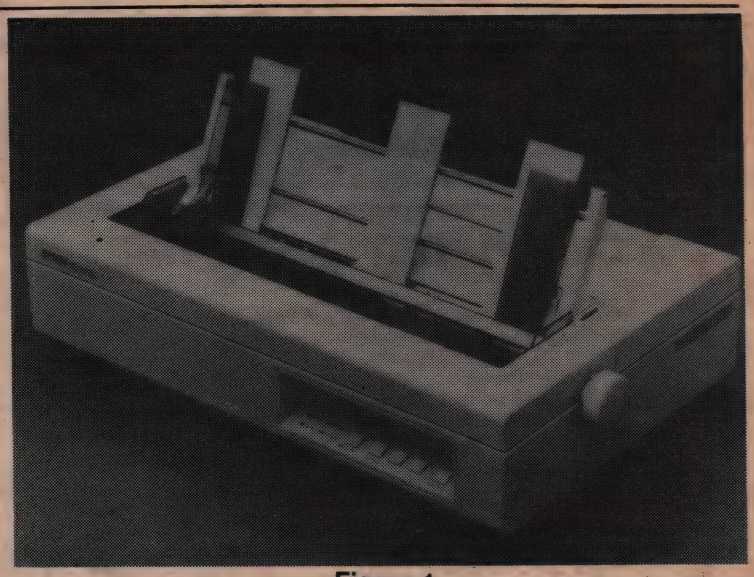

Figure 1
Epson SQ-200 Ink Jet Printer

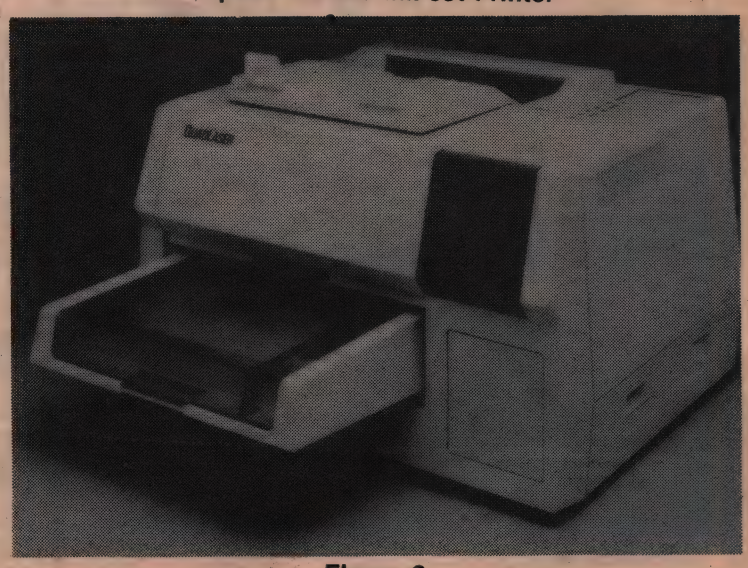

Figure 2
Quadlaser Printer

Why Same Circuits Continued from page 63

Testing Transistors

Transistors can present problems. For example, how do you tell a NPN from a PNP type of device? If you do not have a transistor tester, try the simple circuit shown in Figure 1 to determine which type you have. It uses a 5-volt or so ac-line powered power supply or a battery setup, a couple of resistors, a transistor socket, and a dc voltmeter or a dc scope.

This simple tester is good for testing the switching capability of a transistor and does not really tell you anything about the analog parameters of the semiconductor device. Also, since most transistors are of the NPN persuasion, the positive side of the power supply is connected to the collector load resistor. To check a PNP type, connect the negative side of the power source to the collector load.

This simple tester is based on the premise that when the base of a transistor is connected to the same polarity as its collector, the transistor conducts. And, when the base is at the same potential as the emitter, the transistor cuts off. So, in essence, a transistor is a switch whose state (open or closed) is determined by the base signal. Note also that the middle letter in NPN or PNP tells you what polarity voltage is applied to the collector with "N" being negative, and obviously "P" being positive. Pictorially, the emitter arrow always points to the negative.

To keep the base-emitter diode from burning up due to excessive current, a series current-limiting resistor is connected to the base. The values of both this, and the collector load resistor, is unimportant (anything above 500 ohms is sufficient).

To use this simple tester, connect the dc voltmeter or dc scope between the collector pin on the socket and ground. Note that without the transistor in the socket, the indicated voltage should be the same as the power source.

Plug in the transistor and with the base resistor "floating," note that the indicated voltage does change (if it drops to zero, the transistor has an emitter-collector short).

If the indicated voltage remains high, but each time you connect the loose end of the base resistor to the power source, the indicated voltage drops too close to ground, (and the positive side of the power source is used), then the transistor is a good NPN type. By reversing the power supply polarities, you can similarly test PNP devices.

A couple of invisible parameters of a transistor that may inhibit proper circuit operation "Beta" and "HFE."

Beta simply can be considered as device "gain." Obviously if the circuit being constructed requires a certain stage gain to generate the required output, then using a transistor having a lower gain (low beta) will not allow proper operation, even though a known good transistor is used.

When things are tight and you need a high beta transistor, then using a pair of low-beta transistors in a Darlington configuration (see Figure 2A) will usually work. In this mode, the total beta is (betaQ1 x betaQ2). For example, if one transistor has a beta of 30 and the other has a beta of 10, then the total will be a beta of 300. If the transistor has an ID number, look it up in a manual to find its beta.

The other parameter, HFE, indicates the high frequency performance of the transistor. To operate in the rf range, you must check the HFE in a manual to insure operation at the required high frequency.

Testing Diodes

Diodes can be tested in accordance with the simple circuit shown in Figure 2B. Once again, a low voltage power source is used with a current limiting resistor. Connect the dc voltmeter or dc scope between the bottom end of the series resistor and ground.

As we should know, a diode will conduct when its anode is made positive with respect to its cathode. Thus, if you connect a diode between the bottom end of the load resistor and the ground connector, when the dc instrument indicates a low voltage, this means that the diode is good, and the end connected to the positive is the anode. If the indicated voltage remains high regardless of which way the diode is tested, then the diode is open. Obviously, if the diode is shorted, it will show a low voltage regardless of polarity.

Depending on the low-voltage range of the dc voltage measuring instrument, you can tell if the diode is silicon or germanium by noting the voltage drop across the conducting diode. When a silicon diode conducts the dc instrument it will indicate about .6-volt drop across the diode, while a germanium device will conduct at about half that current. This is why many "signal" diodes in rf equipment are germanium types.

Testing Zener Diodes

To test a zener, you will need a variable dc power supply that goes from a couple of volts to about 30 volts (to cover the most popularly used zeners), a load resistor, and a dc voltage measuring instrument.

The test is the same as for conventional diodes except that the voltage across the zener will remain the same as the power supply voltage is raised. Note also that zeners are used "backwards" in a circuit.

Checking The Power Supply

The next thing to look at is the power supply. Keep in mind that just because a power supply is "supposed" to deliver a specified voltage, it may not be doing this.

It all depends on how the supply adjusts to its load (this is called regulation). Before using any power supply, use a dc voltmeter to check the output voltage **under load.**

Also keep in mind that some types of ICs work properly with a little higher operating voltage than others. For example, quite often you see a mix of TTL and 555 timers. Although TTL is designed to work with 5 volts, some 555s like 7 or more volts to work properly. Some other types of ICs also like somewhat higher than TTL voltages.

Also remember that for a dc regulator IC to work properly, the input voltage should be at least 2 volts higher than its output voltage (for example, a 5-volt dc regulator needs at least 7 volts input). In most cases, the input voltage is quite higher than the output voltage.

Invisible Trouble Makers

Then we have the most mysterious of phantom trouble makers - invisible circuit components.

What you see is not necessarily what is really there.

Remember that the copper circuit traces on a pc board are actually small-valued resistors and as they do have slight voltage drops when current passes through them. In some cases, these voltage drops can "look" like a real signal and cause something unwanted to happen in a digital IC. These traces also have some slight (and invisible) capacitance and inductance, and thus may also behave peculiarly at different frequencies.

Also keep in mind that large-valued electrolytic capacitors can "look" like an inductor at high-frequencies, and thus can contribute to the problem (or may even be the problem in some cases). Always test bypass a large-valued electrolytic with a small-valued bypass to see if that cures the problem. This is especially true when very high frequency oscillations cause bias changes on transistors.

Thus, you can see that there are many reasons why a particular circuit may not work, or works improperly, even when the circuit is correct and all the parts test okay.

The greatest piece of test equipment you can have is knowing how each element in the circuit actually works. More on this in a later column. ●

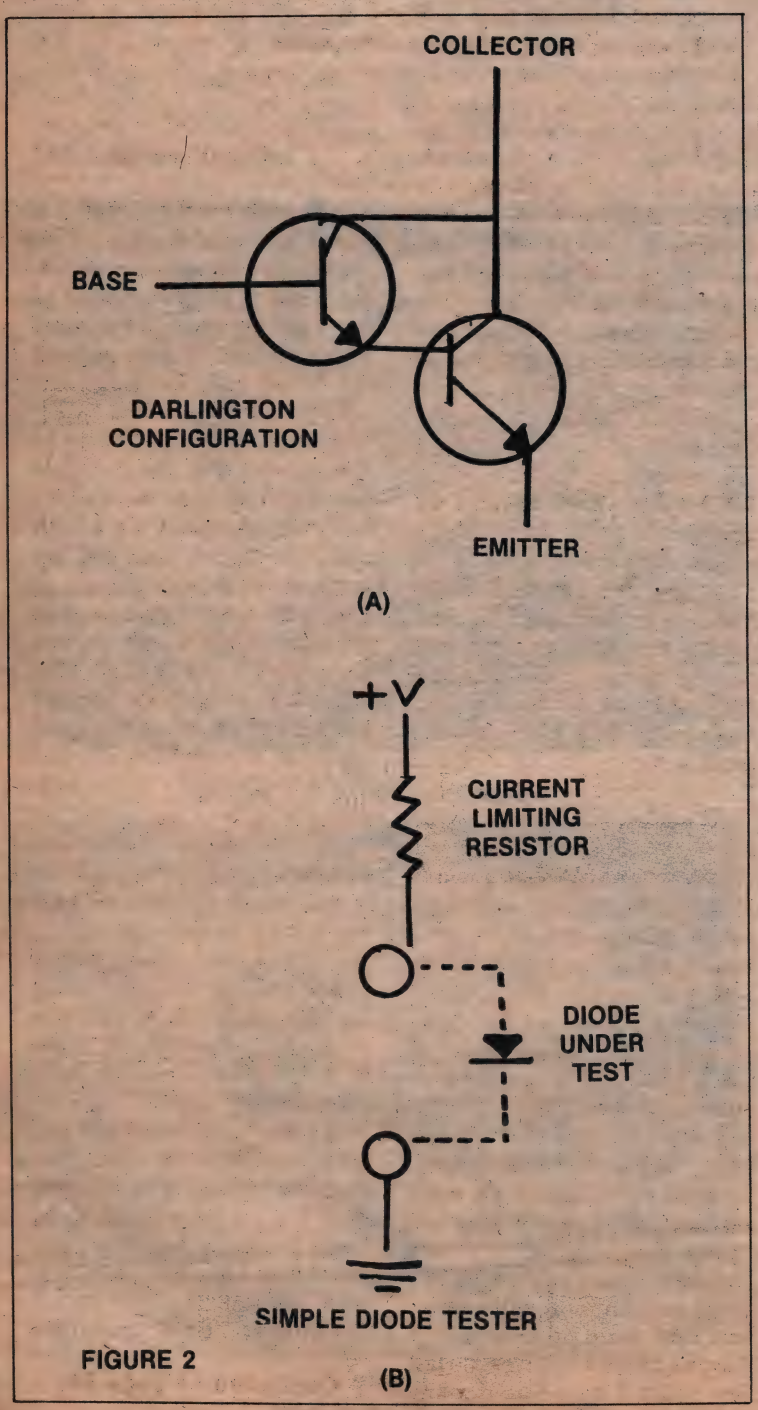

FIGURE 2

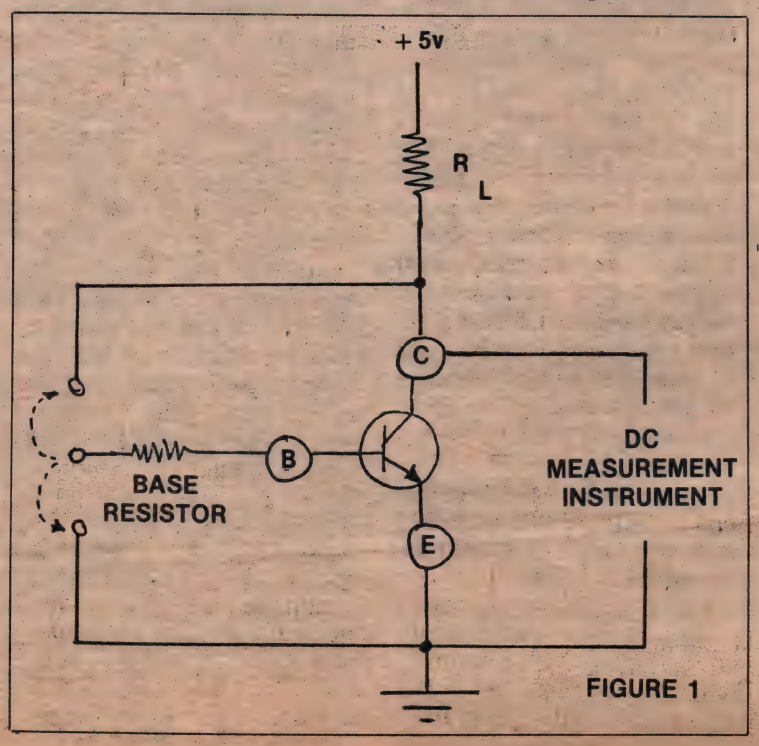

FIGURE 1

TIMEX-SINCLAIR

Timex/Sinclair Survival Column

by Mark L. Fendrick

Usually when a computer is no longer in production, the books which are written and published for that computer no longer appear. That has not proved to be the case with the Timex/Sinclair computers. In fact, the books which now are on the shelves in bookstores fall into two different categories. The first category contains those books which were written in the United Kingdom (home of Sinclair Research) and imported to the United States. These books were written for the Sinclair ZX-81 (T/S 1000/1500), ZX Spectrum (T/S 2068), and the QL. In the case of the ZX-81 books, they are completely compatible with the T/S 1000/1500 and can be utilized with no problem at all. The books written for the ZX Spectrum are mostly compatible with the T/S 2068, but since the T/S 2068 has a modified Spectrum ROM which includes additional features, they are not included in these British books. These imports, however, made up the bulk of the early offerings for the T/S 2068, often with their titles altered to appear to be written for the T/S 2068.

Now, however, books written specifically for the T/S 2068 have been written and published. It is these books which we will consider this month.

We will start at the begin ning with a look at a book titled: **Timex Sinclair 2068 Beginner/Intermediate Guide** by Fred Blechman (published by Howard W. Sams & Co., Inc., 4300 West 62nd Street, Indianapolis, IN 46268). Many of us are familiar with parts of this book which were reprinted in the ill-fated Timex-Sinclair User magazine. A long time fan of the Sinclair computer, Fred is a believer in teaching practical applications rather than just theory. Therefore, you will find clear plain English descriptions with programs to illustrate each subject. Fred sees himself as your guide on safari as you make your way through the book.

The book is divided into two parts: Getting Started; and, Practical Programs. You are taken from the set-up procedure (including a description of each part of your system) through BASIC programming. Each chapter takes you further along in your becoming familiar with the T/S 2068, and what you can do with it. The four display modes are explained early on, but there is no explanation of the application of any but the normal mode, but as this is a basic guide, that is all you would expect. The keyboard is introduced to you in a brief program which gives you the opportunity to access most of the commands you will come across on the T/S keyboard.

The next section, entitled "The Basics of BASIC," is a clear tutorial on the use of Sinclair BASIC. Along the way, Fred has included a number of short programs which illustrate the procedures discussed. (Examples are the ESP tester which is used to demonstrate the use of the random number generator; and the digital time which demonstrates the FOR...NEXT loop.) Each section has a few questions at the end for you to evaluate how well you understood the material presented.

Part 2 gives you some practical programs and explains how they work. There are two sections in this part. The first one deals with home and personal use programming. Included in this section are "On Your Mark!," a footrace using graphics, colors and BEEPs; "Toll Totalizer," which is a digital timer to keep track of the cost of long distance telephone calls; and "Bio-Graph," which plots your biorhythms. The second section, which is hobby programming, includes "Basic Banner" which allows you to print messages lengthwise along the T/S 2040 printer paper; "Collection Evaluator" which gives you a way to keep track of any collection you may have, "Sounds of Music?" which is a music maker program utilizing the Timex BEEP command; and "Long Distance Navigator," which may be used by pilots, boaters, or "ham" radio operators (such as Fred). All of these programs are fully documented with each routine fully explained. Even if these programs are not useful to you as they are, the demonstration and description of the techniques involved are useful to anyone interested in programming his own applications.

This book is a joy to read thanks to Fred's easy going style and humor, and should be required in every T/S 2068 owner's library, from the novice to the experienced programmer.

The follow-up to this book, **Timex-Sinclair 2068 Intermediate/Advanced Guide**, by Jeff Mazur, is a story in itself. When I first got my copy of the Beginner/Intermediate Guide, there were many things I had hoped to read about, but was referred to the upcoming Intermediate/Advanced guide for much of it. I contacted the publisher only to be told that the book had been removed from the publication calendar. However, if there was enough interest, it might be put back on the schedule. A letter writing campaign was launched, and finally the decision was reversed, and it was published.

The Intermediate/Advanced Guide is designed to take you beyond BASIC - to make your programs run faster and do things otherwise impossible with BASIC. It also shows you a little more about how the computer works. Like its predecessor, it is divided into two parts.

Part 1 is "How Computers Work," and is a general guide to computers, not the T/S 2068 specifically. The parts of a computer and how they interrelate are discussed as well as bits, bytes, and Boolean logic. The binary and hexidecimal number systems are covered as well.

The final chapter in Part 1 is Exploring the T/S 2068 BASIC. The operating system is explained, and you are shown how the T/S 2068 handles variable storage, program storage, and the operation of the BASIC interpreter.

Section B of Part 1 takes you inside the T/S 2068. The Z80 Central Processing Unit is explored, and the memory map is discussed. You are introduced to such things as bank switching and Input/Output facilities. A chapter discusses connecting the T/S 2068 to the outside world via the joystick connector, the DOCK connector, and the peripheral expansion connector. The programmable sound generator is next on the menu, and the SOUND command gets a thorough workout here. The last chapter in Part 1 describes the Video Display, and the four display modes on the T/S 2068. I must admit the disappointment here, however. I had hoped that after reading this chapter I would be able to use the 64 column display mode. Unfortunately, although each mode is described with some technical material, there is no help given towards the utilization of any but the basic 32 column display mode.

Part 2 of the book is concerned with machine language programming. Chapters 9 through 13 are a tutorial on Z80 machine coding in general, with chapter 14 relating all of that to the T/S 2068. Chapter 15 is a guide to the routines built into the T/S 2068 ROM which can be called from your programs.

Combined with the Beginner/Intermediate guide, these two books form an excellent reference work for all users of the T/S 2068. Both are at the reasonable price of $9.95. The set would also make an excellent gift for that T/S 2068 owner whose birthday, or other occasion, is right around the corner.

Another book just published by an author familiar to most Timex/Sinclair owners is **T/S 2068 Basics And Beyond** by Sharon Zardetto Aker. Many of us recognize her as one of the most prolific contributors to Sync, and other publications which formerly covered the Sinclair computers. Basics And Beyond is just what you would expect from Ms. Aker - a well-written, easy to understand tutorial.

The book contains over 120 short programs written by Ms. Aker to illustrate the techniques she describes, and each program is accompanied by a line by line annotation of its structure. In fact, many of the commands just briefly mentioned in the Timex manual are illustrated in this book in such a manner that you can quickly understand how to use them in your own programs. In fact, not only are the most obvious uses pointed out, but many simple refinements are explored which can make your program run more efficiently, and look more professional. (I have to admit that over the last few years, I have found many of Ms. Aker's tips extremely useful in creating many of my own programs.)

Not only is pure program ming discussed in this book, but you will be treated to enlightening discussions on music theory, logic, trignometric functions, and so much more in a manner which makes you want to read the book from cover to cover.

Twelve chapters and three appendices make up this book, and between its covers is a true wealth of information not found in any other manual. Two full chapters are devoted to techniques including a section on program development and polishing. The chapter on graphics has the best description of user defined graphics I have seen anywhere. In fact, Appendix B gives you the necessary data required to produce 46 UDGs including card suits, balls, arrows, boxes, patterns, gobblers and building blocks.

Although each chapter is a gem I was most impressed by the chapter on sound with the T/S 2068. The thirty pages of this chapter present the most thorough instructions of both the BEEP and SOUND commands. Although the BEEP command is relatively easy to master and use, the SOUND command is not. Ms. Aker, however, does not start with the presumption that you are familiar with music theory, or any of the other terms (such as envelope, register, etc.) which are needed to utilize this capability. In fact, she does not assume any prior knowledge of anything regarding music, but explains and illustrates everything you will need to know. When you finish this chapter, you should be able to create music (with three part harmony if you so desire) or sound effects to enhance your programs. To help you even further, Appendix C contains some charts with values to use in the development of your programmed sound.

If I had to recommend one book for the T/S 2068 programmer, it would be this one. At $9.95 it is published by Scott, Foresman and Company (1900 East Lake Avenue, Glenview, IL, 60025).

Another title recently

Continued on page 66

Data General Announces Link Between Data General/One Portable And IBM PC

Data General Corporation has announced PC Liaison, a software package that enables a user to transfer data files be tween the Data General/One portable computer and an IBM PC or IBM XT computer.

PC Liaison allows a Data General/One to access the 5-¼-inch diskette drives of the IBM PC or XT and the hard disk of the XT. In addition to file transfer, PC Liaison allows programs which are not copy protected to be run on the Data General/One from the PC drives.

According to Agnes Imregh, Manager of Software Marketing and Acquisitions for Data General's Desktop Division, "With PC Liaison users can now generate their own data files using popular applications such as Framework, dBase III, Wordstar and Lotus 1-2-3, and then transfer them between the Data General/One and the IBM PC. The same data can now be used in the home, the office or on the road."

Imregh continued, "PC Liaison is well documented, easy to use and to set up. In most cases it is the ideal 5-¼-inch diskette solution."

PC Liaison will run on any Data General/One system as well as on any IBM PC operating MS-DOS 2.0 or 2.10 which has at least one diskette drive, 192 kb of memory and one asynchronous port.

The package includes a five foot cable for connecting the Data General/One to the IBM PC, a 3-½-inch diskette for the Data General/One and a 5-¼-inch diskette for the IBM PC. The package is available immediately and is priced at $180.00.

For further information contact the Desktop Division at Data General, 4400 Computer Drive, Westboro, MA, 01580, (617)-366-8911.

Mention that you read about it in the **Computer Shopper.**●

TIMEX/SINCLAIR

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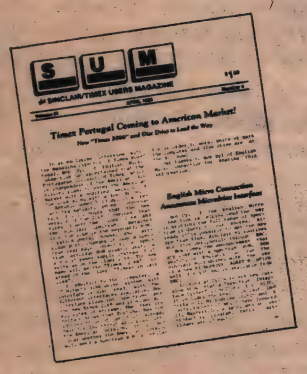

ZX-81 TS-1000 TS-1500 TS-2068 Spectrum QL
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SUM Magazine is aimed at Timex/Sinclair owners who want to do more with their computers, to know what is new and what is just over the horizon. Articles in recent issues included: Building a Spectrum Emulator; Word Processors for the 2068; Adding an RGB Monitor; and Repairing a TS-1000 or ZX-81.

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Timex/Sinclair
Continued from page 65

published by the same publisher is **Powerful Projects With Your Timex/Sinclair** by Jim Stephens. Unlike the books we have looked at so far, Powerful Projects includes the T/S 1000 and 1500 in its descriptions of projects. This book is aimed at the Timex/Sinclair owner regardless of which unit he has.

As you may guess from the title, this book is for those interested more in hardware development than software development. It is for the beginner who wants to learn something about computer electronics. A discussion of the Z80 CPU starts you off, leading into the physical requirements of the Timex computer. There is a discussion of control software and control devices; and then you are ready to start your first project. I/O ports are discussed and you are shown how to construct the 7475 Output port and the 8212 Input port.

In chapter 4 you will build home control devices such as electrical and lighting controls, a three channel home appliance controller, a mail indicator and an automatic tape recorder controller.

Maybe robots are what interest you these days. The chapter entitled Microbotics covers the topic including robotic parts, the robotic platform, the robotic arm and hand and robotic feedback. A speech synthesizer is included in the following chapter.

The final chapter has such advanced feedback projects as an analog to digital converter, a weather station, a moisture detector, wind indicator and temperature sensor.

Nine appendices (including a list of mail order suppliers) complete the book. Two of these are of interest particularly to the T/S 1000/1500 owner. They are Appendix H (A Device-Select Decoder for the TS 1000 and 1500) and Appendix I (Converting 2068 Software for the TS 1000 and 1500).

Finally, we look at a book from Bookware (Reston Publishing Company, 11480 Sunset Hills Road, Reston, VA, 22090) entitled: **Timex Sinclair 2068, 1500 And 1000 Machine Language Programming And Interfacing** by Joseph J. Carr.

This book is more for the experienced experimenter than the previous book, as many assumptions are made as to the readers' knowledge of electronics. While the last book we discussed was a book of projects, this book is more in the way of theory which will enable you to design and construct your own projects.

Chapters 1 through 4 (Getting Started) is a look at the Timex computers, their set-up and operation. Chapters 5 through 13 (Interfacing Hardware) is mostly concerned with connecting the Z80 CPU to the outside world. (The author of this book is also the author of the Z80 User's Manual.) Chapter 11 in this part deals with the Timex interface connector. Chapters 14 through 19 (Machine Language Programming) deals with actually programming the Z80 CPU in the Z80 instruction set. Chapter 18 in this part is entitled Machine Language Programming of the T/S 1000, but is a very sketchy two pages, and does not mention the 2068 at all.

To sum it up, while this may be a fine book on program ming and interfacing the Z80 CPU, not much of it is firmly referred back to the Timex computers which it purports to be about. If, however, you are in the market for such a book, and have some knowledge of the computer you will be relating the information to, this book may be for you.

My apologies go to two fine Timex/Sinclair suppliers for errors which appeared in June's column. The new Winky Board from G. Russel Electronics is for the Radio Shack CoCo (not Commodore 64), and the E. Arthur Brown Co. is in Alexandria, MN (not Virginia). Sorry Bill and Eban.●

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- It has dual 800K disk drives much like the $2495 Tandy 2000, but unlike the 2000 it will also read and write to 160K, 320K, and 360K IBM-PC formats.

- It's an 8088, MS-DOS system with 256K of RAM, but it comes with a better free software bundle than the 8-bit Kaypro including MS-DOS 2.11, HAGEN-DOS, DOS-TUTOR, WordStar 3.3, EasyWriter, Spell, Mail Track, PC File III, FILEBASE, CalcStar, games, graphics, utilities, and two BASIC languages.

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Windshields
Continued from page 41

at a rate faster than the amortization of development costs. The frontier will continue to be littered with the whited bones of computer companies that were the sensation of last Comdex. Companies will rise and fall meteorically as the cycle of innovation shortens and as inventories of last year's brightest dreams are suddenly transformed into piles of worthless junk. The same phenomenon is now sweeping through software. Commercial volatility will continue to be a fact of life, price and features competition will consume even the best innovators, and users will be in the catbird seat.

The more telling implication is that the single user with his micro will possess the power and the interconnections that until now were available only to large corporations and government. All the prog gnosticators saw it coming as an abstract idea. But now we can see its fulfillment in the concrete. The implications of windows are coming to pass. To paraphrase McLuhan, the windows on our monitors are the windshields of the supercars that are carrying all of us pellmell into a whole new world!

The Future Shock syndrone is happening before our very eyes, the obsolescence of corporate bigness and the empowerment of the individual.

Framework Leads The Way

The FW impact on professionals in the industry is amazing; yet sales are lagging well behind the competition. Partly this is due to the financial troubles of Aston-Tate and the sudden death of the corporation's founder. FW was brought out well behind Symphony, was troubled by a number of bugs and had to be re-released a second time. All the while, it looked like the company, in spite of the enormous success of DBaseII (and later DBaseIII), was not going to make it. Even now, the future is problematical. Yet came FW shining with its remarkable originality and power, making plain that whatever the bankers decide, the software and its progeny will live on in one form or another.

The other part of the explanation for the slow start, Framework is just a little bit ahead of its time. Requiring about 384K RAM to use all of its capabilities, it leaves scant memory to actually do any work. In a 640K PC, there is room for only about 100K of data files once the main program has been loaded, hardly enough for any serious use, and obviously not enough to begin to tap the potentials of infinite windowing and multitasking.

Yet it is already clear that FW has a wonderful future. When the 80286s, the 68000s, and other new chips catch up with demands, FW will come strongly into its own. The ATs, the Fat Macs, the PC/IIs, the new line of AT&Ts, the 32-bit and 64-bit CPUs, and new megabyte memories are creating a real break with the past. So far, too many of the most successful programs are ported up from 8-bit machines, if not in architecture than in ideas. All of them will soon be as ancient and discarded as dedicated word processors. Of the new wave of software, FW alone breaks thoroughly with the past and leaps into the future. But its day is not yet here, but it's surely coming...

Symphony Not In League

This cannot be said of other windowing releases of 1984. Most of them are laborious cases of pasting multiple windowing and integration on collections of older ideas. All of them will become more useful with megabyte RAMs. But Symphony is not in the same league as FW. Based on the concept of the spreadsheet, its windows and "windowpanes" are rigid and awkward to invoke. There is a tedious process by which whatever is written in one is written in all, until the user defines moves the range to another part of the spreadsheet. The windows are hard to size and move, and the methods for moving among different operations are a pain.

Symphony lacks the outlining and programming functions which provide FW a basis of integration that goes beyond mere merging of files to something more basic, the merging of ideas, the replication in the computer of the actual creative processes of the mind.

Framework itself was rushed to completion by pasting in a non-integral part, the MITE communications package. That can be remedied later perhaps, but the future advantages outweigh the com-

Continued on page 70

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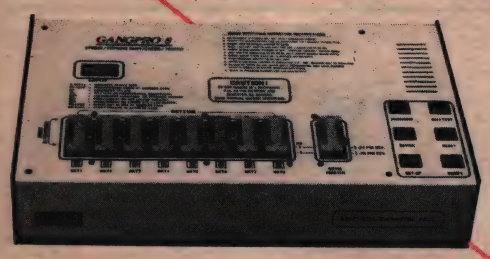

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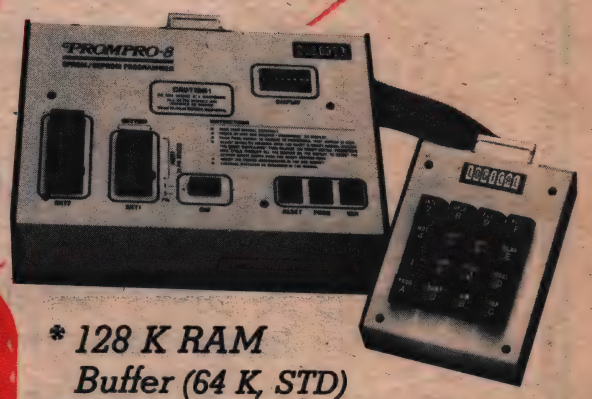

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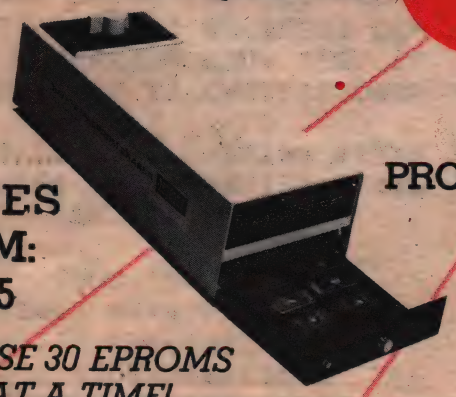

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DoubleDos
Continued from page 41

both share one feature in common - they are memory mapped. This means that the computer and video card share a common area of addressable memory. On a monochrome video display adapter, the common memory area begins at hex segment B000. The graphics adapter uses memory beginning at hex segment B800.

MS-DOS has several facilities for writing characters to the proper display adapter and programmers are supposed to use these interrupts for all screen related functions. While these DOS facilities help to standardize I/O, it also creates a small problem in that screen manipulation is somewhat sluggish.

In order to get around this problem, some programs find it necessary to bypass DOS and write driectly to the screens memory locations (using the equivalent of a "POKE" command.) When the proper character is placed in the proper location of memory, it comes up on the screen instantly. Most word processors and spreadsheet programs requiring intensive video interaction have found it necessary to take this programming approach despite MicroSoft's admonishment against doing so (it's interesting to note that even MicroSoft had to bypass DOS in their own word processing program The Word.)

When one of these programs are running in the background, DoubleDos is unable to prevent the application program from writing to the screen. The result is that while you are in another program, your background program will continue to write on the screen! In all fairness, the problems lie not with DoubleDos but with the offending program.

Conclusion

DoubleDos suffers from a terminal case of "Prolok-itus." In other words, it's copy protected! Running DoubleDos from a hard disk is possible so long as the distribution diskette resides in the floppy disk drive when you first install the program. That's too bad, because that alone would prevent me from purchasing this otherwise excellent software program.

While there has been a lot of hype about the "speed" of the PC, lets face it, the PC is not a speed demon. When you are performing CPU intensive operations like compiler operations or sorting, DoubleDos causes the second program to run so slowly that you would probably do better to run each program one after the other.

DoubleDos performs quite well when at least one application either requires operator intervention or works with the printer. In such an environment, DoubleDos demonstrated little difficulty in maintaining an acceptable level of performance.

One particularly useful application for DoubleDos is as a print spooler. While PC-DOS does have a print spooler called PRINT, it works only with ASCII files that are sent to the printer. With DoubleDos, you can have your word processor run in the background while printing lengthy documents. Also, programs like Sideways can run in the background while you are occupied with something else in the foreground.

If you often use programs that write directly to the screen, DoubleDos will be more aggravation than it is worth. Also, the version of DoubleDos that I evaluated (2.1L), completely locked my machine up when running under Dos 3.0. Perhaps that's what the "L" in 2.1L is for! A newer version was released days after I received the program but was never sent to me despite several phone calls to SoftLogic. If you are using Dos 3.0, as I am, don't plan on using DoubleDos until SoftLogic assures you that it will run properly under 3.x.

DoubleDos currently carries a suggested retail price of $99.00.

SoftLogic Solutions
530 Chestnut Street
Manchester, NH 03101 ●

Windshields
Continued from page 69

promises. The organization of menus breaks new conceptual ground, avoiding the wearisome "around the barn" routines of going through 3 to 6 menus and pointer moves before one implements the correct command. On-screen formatting, with boldface, underlining, and italics actually shown on the monitor as they will be printed let us know that we are dealing with something really new and different.

IBM's Top View

IBM's Top View (TV) emulates many of FW's features. One can load in up with whatever programs desired, and access all of them in multiple window, exchanging data among them freely, so long as memory allows. But the command structure is stoney and complicated. To do anything involves a tedious string of keystrokes. But even Top View demonstrates the direction things are going. Big Blue knows that multiwindowing and multitasking must be ported to the micro environment. The desktop computer is getting so thick with capabilities that windows must be opened into all the operational potentials. Users will require simple and expeditious means of entry, but TV doesn't quite make it.

Like Symphony (and UNIX), it must be viewed as a transitional stage in the evolution. TV sets out to do the right thing. It is a hard disk "program manager," enabling the user to bring to the desk top (in its own window) any application on the drive which has been assigned. It works very well, but is creaky in the joints. Where FW is transparent and rapid, TV is intrusive and cluttered. Furthermore, the latter occupies about 170K of memory on top of the requirements of the actual pro-

Continued on page 71

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Windshields
Continued from page 70

grams which it is supposed to manage.

In the long term, utilities that deserve to survive must be more economical and transparent than other kinds of software. I cannot help but feel that it is destined to a quiet demise when someone finds a better way to accomplish the same goals.

TV goes beyond FW in one important respect. It is not itself an integrated package of operations. Rather, it is an open framework into which any software can be poured, thereby providing windowing and multitasking for programs to fit the user's needs and tastes. FW has only minimal open frame capabilities, allowing the user to open only one window to DOS at a time, into which an outside program can then be loaded and run. But even this is limited. In order to move to another FW window, the user is forced to exit from DOS, thereby removing from memory the outside program and its data. To return to it requires repeating the same procedure from scratch. Obviously, the next step for FW would be to multiply and concurrently keep in memory several outside programs.

"Panorama," which uses only 64K and runs faster than Top View, was recently announced by Dynamical Systems, a California startup firm. According to company claims, the windowing utility provides multitasking, cut/paste data transfer among windows, and hard disk and network program management while avoiding the memory overhead costs. In addition, Panorama includes a facility to support batch files, something missing in the IBM entrant. Still far away from a commercial product, this is still in the evaluation stage, and we'll have to wait to test the company's claims.

Marking the trend also are the large number of new application management packages that follow on FW and Top View. Soon to appear is Quarterdeck Office Systems with a program called "Desq," an odd spelling for "desk," Digital Research Inc. with Concurrent PC-DOS, Microsoft with "Windows." The first two are quite as large as Top View, and no independent critic has so far tested their transparency. Microsoft does most things very well, and reports that Windows, to be delivered in June, will occupy less than 100K when the pro-

Continued on page 73

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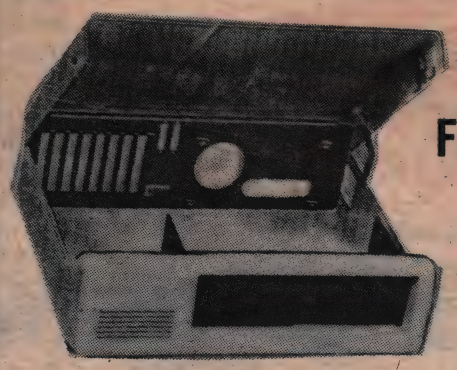

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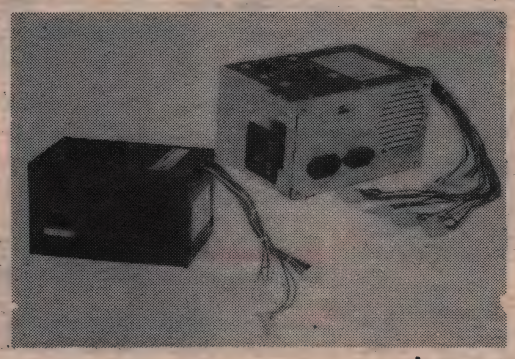

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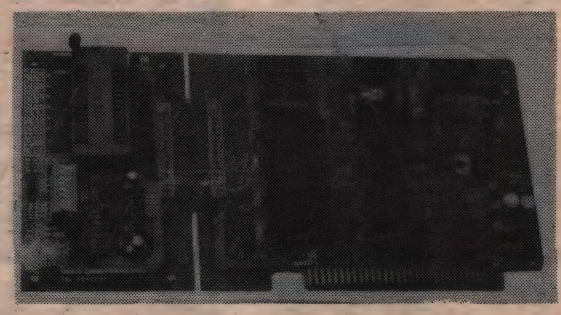

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		2732	32 Sec.
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Windshields
Continued from page 71

grammers finish with it.

Among existing products, none are really in the same league as FW and Top View, but do offer some limited windowing functions. APX Core, from Application Executive Corp. of New York, occupies only 43K bytes of memory and is available now for only $99.

There is also GEM, an applications management, windowing, multitasking system that turns the PC into a relative of the Macintosh. By Digital Research, Inc., Peter Norton considers it has "terrific chances of beating back Top View." DRI is already ship ping GEM in Japan for the IBM-JX, which some people believe is the IBM's Off-Broadway introduction of the PC/II. Jack Tramiel's new "Jackintosh" is run by GEM, and, according to independent witnesses, may not only leave Top View in the dust, but also Fat Mac and PC/II!

Program size will probably not be an issue for the new generation of micros. Rather, the goals will be speed and user transparency. There will be memory to burn. Because such programs are really management shells, they must pass their speed along to other applications, giving Lotus-like screen speed to even the most conventional kinds of software already in the users' inventory. Compact code and speed are complementary attributes and will no doubt continue to go hand in hand.

The central importance to be played by windows and applications managers is clear in all this palaver. Perhaps, by the time this appears in print, some of these products will be available for examination.

EZ-VU and ADM

IBM labs have been very busy exploring the next phase. The results are two interesting utility programs that can be used for program development and/or concurrent application display and management.

ADM (Application Display Management System) is exactly what its name implies. It permits an installation, especially an LAN in an institutional environment, to tailor its own user interfaces, including such things as fields for input/output, interrupt key assignments, messages, function key macros, input validation, etc. The system allows the management functions to remain independent of the applications themselves. It is not for the casual user, but can be an immensely powerful tool in the design and operation of multitasking/multiuser systems involving both micro LANs and mainframes.

EZ-VU (Interactive System Productivity Facility) performs much the same functions, tailored more specifically for the PC and compatible with Top View. This interesting product has lingered in some obscurity, possibly because of rivalry within the company. EZ-VU, according to a development team leader, "has the potential to provide a common, on-screen interface for all applications from the PC up through the mainframe." IBM-White Plains this month (April) released "The Personal Computer Organizer" which optimizes the micro uses of EZ-VU, using its run-time programs, and allowing all state of the art windowing, multitasking, multiuser operations. A single menu allows easy movement from one application to another, concurrent processing, and transfer of data between applications.

Both ADM and EZ-VU will be especially useful for programmers, allowing modules written in different languages to be inter-related by the user in different combinations. But neither of these packages will be of much use to the small user or the individual. They are both very heavy on resident memory and require considerable technical skill to design for specific uses.

The Lower End

One should not neglect the lower end of the spectrum, the windowing memory-resident capabilities of Sidekick and its imitators. This includes PolyWindows Desk, by Polytron Corp. of Hillsboro, Oregon, Spotlight, and Rolodex, etc. Many of these products are somewhat more advanced than Sidekick. The latter was the first and enjoys and deserves its great success; but it lacks the open-ended capacity to insert outside programs. Most of the new entrants do have some limited capabilities of this sort, and also claim to have "Top View Compatibility," the emerging badge of merit that all software will probably soon be advertising as the age of windowing and multitasking becomes the "normal" environment of computing.

It has been our purpose in this piece to look at the windowing phenomenon whose deeper implications are coming to pass in 1985. And also to celebrate Aston-Tate's remarkable achievement of Framework, perhaps the first software for the small computerist that provides real windshields of the future. ●

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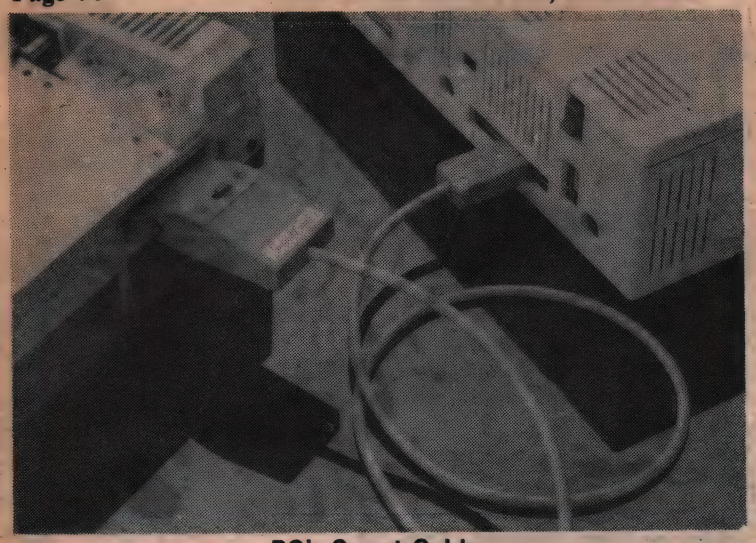

PCjr Smart Cable

IQ Technologies
Continued from page 42

sively. The suggested retail price is $49.95.

Like other IQ Technologies Smart Cables, the SC807 is an intelligent interface cable that looks at the signals coming from the PCjr and the peripheral and uses its own built-in "intelligence" to make the right connections. All the user needs to do is plug-in the cable and set one switch. The SC807 matches up all the data, handshake and control lines automatically. Another peripheral can be connected by just plugging-in the Smart Cable and resetting the switch.

IQ Technologies, Inc. manufactures and markets a complete line of "smart" RS-232 computer equipment connectors.

Complete information on IQ Technologies' new SC807 Smart Cable for the IBM PCjr is available from IQ Technologies, Inc., 11811 N.E. First Street, Bellevue, WA, 98005. Telephone (206)-451-0232.

Mention that you read it in the Computer Shopper. ●

Computer Printers
Continued from page 42

per second (cps), reports at up to 100 cps, and near-letter-quality documents at up to 40 cps. Personal computer programs can be used to change print speeds and produce many different type styles, including those with serifs and italics.

The all-points-addressable Proprinter can print graphs, charts or drawings with as many as 17,280 dots per square inch.

The new IBM Color Jetprinter prints on 8½-by-11-inch coated transparencies and on several kinds of coated paper: micro-perforated continuous form, micro-perforated roll or cut sheet. The unit will also print on most kinds of standard bond paper. It prints in black, yellow, red, green, blue, cyan and magenta. The inks are stored in easy-to-change, "no mess" cartridges and flow onto the paper through four ink-jet nozzles.

The Color Jetprinter, which is also all points addressable, prints graphics with a density of up to 9,600 dots per square inch in a single pass and up to 19,200 by double printing. Text can be printed in any of four pitches, each with two speeds. With a normal pitch of 10 characters per inch (cpi), near-letter-quality documents are printed at up to 20 cps and drafts at up to 33 cops. With a condensed pitch of 16.7 cpi, near-letter-quality documents are printed at up to 30 cps and drafts at up to 50 cps. Normal and condensed pitches also can be printed in expanded mode - 5 and 8.3 cpi, respectively - which results in a 50 percent reduction in printing speed.

Personal computer programs can be used to change print speeds and select any of nine fonts stored in the Color Jetprinter.

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Supplies for the new PC

Continued on page 76

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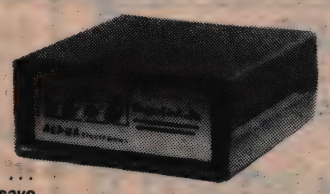

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Complete ALPHA kit* The Buffer..... $99.95 (Cables not included) Please add $5.00 P & H

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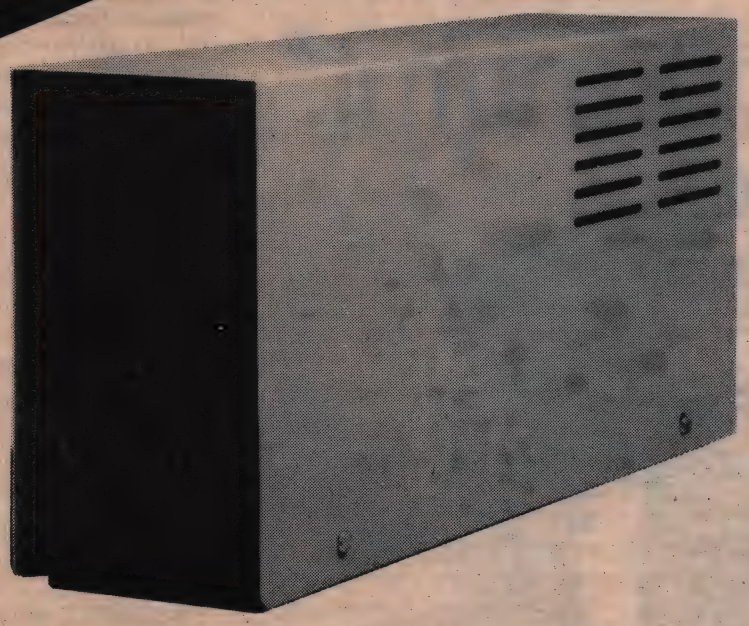
With our great industry purchasing power, FLOPPY DISK SERVICES has 2 GREAT DEALS for you!



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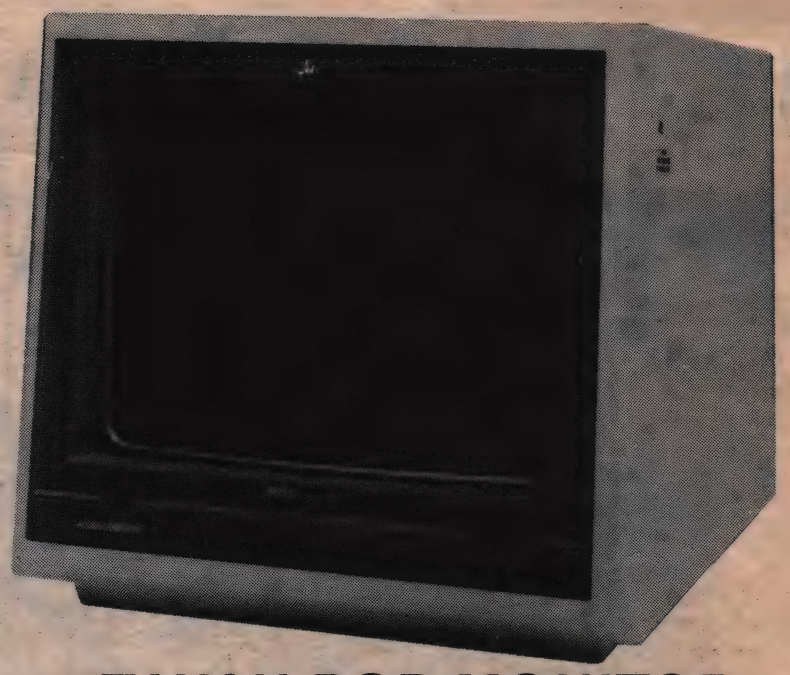

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FLOPPY DISK SERVICES INC

Micro Data Base Systems, Inc. Announces KnowledgeMan Training Seminars

Micro Data Base Systems, Inc. has released its current schedule of training seminars for users of KnowledgeMan, the integrated knowledge management software for microcomputers. Held in eleven cities across the country, these seminars can help both beginning and experienced KnowledgeMan users develop applications that can best tap the system's capabilities and maximize user benefits.

Micro Data Base Systems is unique among software firms in offering its own training sessions. Because of the instructors' first-hand knowledge of the product, attendees can be assured of receiving the latest and most accurate information about KnowledgeMan and its components, including K-Graph for color business graphics, K-Paint for interactive forms processing, K-Text for text processing, K-Report for report generation, and K-Mouse for keyboard-free applications.

Each seminar lasts two days, with separate classes for beginning and advanced users of KnowledgeMan. Persons interested in attending should state in which class they would like to participate.

Upcoming seminar locations and dates are as follows:

New York: May 7-8; July 9-10.
Los Angeles: May 14-15; July 16-17.
Chicago: May 28-29; July 22-23.
Dallas: June 18-19.
San Francisco: June 25-26.
Atlanta: June 11-12.
Seattle: July 2-3.
Baltimore: July 30-31.
Denver: June 4-5.
Providence: May 21-22.

Future seminar dates and locations will be announced as they are confirmed.

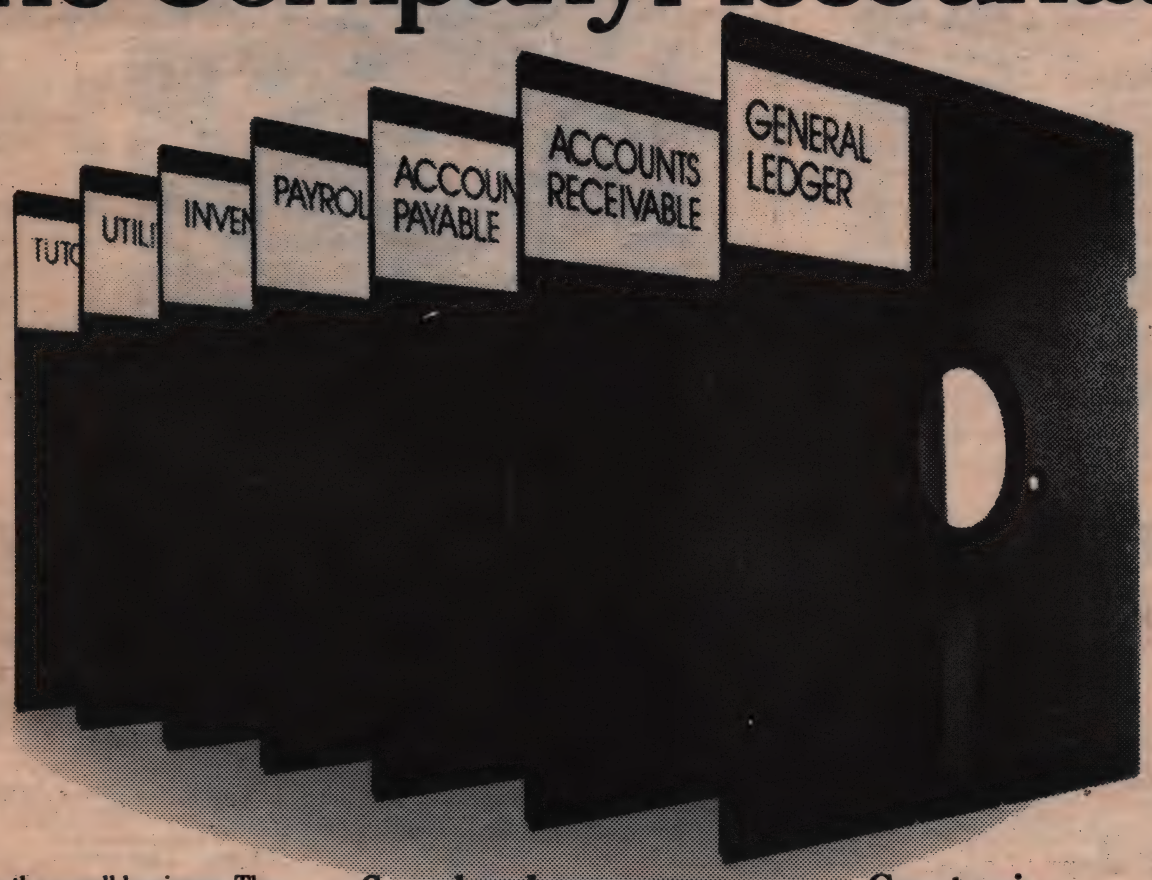
For further information contact the KnowledgeMan Training Co-ordinator; Micro Data Base Systems, Inc., P.O. Box 248, Lafayette, IN 47902; or call (317) 463-2581.

In addition to the training sessions listed above, special "on-site" seminars for corporations, governmental agencies, and users groups are also available. Contact Micro Data Base Systems for open dates.

Mention that you read about it in the *Computer Shopper*. ●

Introducing

"The Company Accountant"™



Designed for the small business, The Company Accountant works for you, providing the timely and reliable information needed to develop strategies and make good management decisions.

With the GL, AR, AP, Payroll, and Inventory programs that provide over 51 easy-to-understand reports, The Company Accountant handles your small business accounting needs now and in the future.

A system to fit your needs

The Company Accountant is built to be flexible with programs that can be tailored to your needs. The programs can be used individually or together, with each program fully explained in the clearly written manual.

The manual reviews basic accounting principles with a comprehensive tutorial, a command and report reference, and a complete glossary of accounting and computer terms.

System Requirements
IBM PC, XT, AT or true compatible with 128K RAM; Monochrome or color monitor; DOS 2.0 or greater; 2 320K disk drives or 1 320K disk drive and 1 hard disk; Printer capable of 132 columns.

Speed and accuracy

The Company Accountant is a fully integrated system that makes accounting fast, efficient, and accurate.

Using the double entry method with complete integration, you only enter figures once. And they are always current as of the last transaction.

On demand, The Company Accountant provides a wide variety of reports, ranging from the familiar balance sheet and income statement to customer and vendor activity, payroll information, inventory values, and stock levels.

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- Data compatible with:
  - Rocky Mountain Desktop Accountant
  - Insoft Accountant
  - Peachtree PeachPak 4 series
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Great price

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Computer Printers
Continued from page 74

printers include: a snap-in fabric ribbon cartridge for the Proprinter and, for the Color Jetprinter, special coated paper, 8½-by-11-inch coated transparencies and replaceable ink cartridges. Supplies are available from IBM Product Centers, IBM Authorized Supplies Dealers, National Distribution Division supplies sales representatives and IBM DIRECT'S telephone number, 1-800-IBM-2468.

Volume purchase discounts for the Proprinter and Color Jetprinter are available through IBM Product Centers and the National Accounts and National Marketing divisions.

For more information contact IBM, Information Systems Group, 900 King Street, Rye Brook, NY, 10573.

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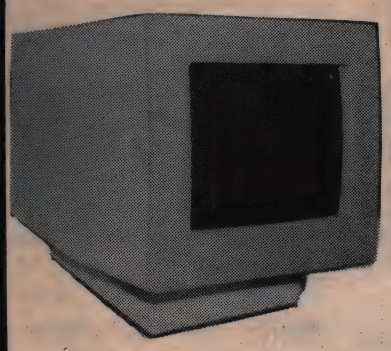

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IBM * Compatible

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Separate Horizontal & Vertical Sync 110VAC

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Add $50.00 for cabinet/swivel base)

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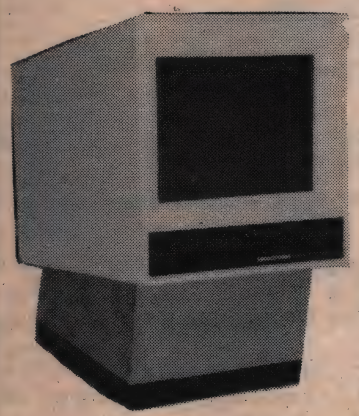

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Composite Video =
110V (Used Good Condition)

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PC MONOCHROME CARD (Intersil Systems)

Fully PC/XT compatible; 720x350; 80x25; hi res character box 9K14; blink, underline, reverse, intensified, block graphics, direct drive output (9 pin - D connector).

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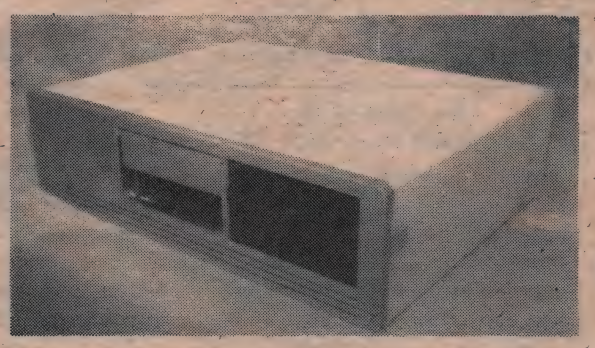

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1. 64K to 384K, fully PC/XT compatible, 8 bit word site, parity, single 5 volt supply, complete with 64K, fully assembled and tested, all lines are PC/XT L/O slot compatible, high speed (150NS), fully socketed. ..... **$119 EA.**

2. 64 to 512K, same as #1. ..... **$159 EA.**

3. 256 to 2.04 meg. same as #1 (except no 64K memory included); uses 256K drams; OK memory included. ..... **$199 EA.**

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Transfer Rate: 806 KByte/Sec.
Average Seek: 45 MSec
Max Seek: 85MSec
Interface: Priam Standard

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IBM Introduces Personal Computer Model For Finance Industry

IBM announced a new model of the IBM Personal Computer for use in banks and other financial institutions.

The IBM 4700 Personal Computer, a new model of the PC XT, can combine data from standalone PC programs with typical "platform officer" applications such as new account and loan processing in the widely used IBM 4700 Finance Communication System (FCS). For example, users can use PC applications such as spreadsheets or word processing to review or change information in the financial data bases of large computer systems.

IBM 4700 PC For Banks

The 4700 PC workstation, which features a 107-key finance keyboard, can work with keypads for entering personal identification numbers (PINs), magnetic stripe readers and other devices in the 4700 FCS product family.

In a typical transaction, a loan officer in a branch office can use the 4700 PC to enter initial information on a new auto loan and send it to a 4700 FCS controller for local storage. When the customer provides the actual amount of the auto purchase, the officer locates the loan in the controller data base, keys in the final amount of the loan, sends the completed information to the host computer for final processing, and uses the 4700 PC to write the customer a confirming letter.

Special Keyboard, Options

The 4700 PC finance keyboard is tailored to the needs of banks and other financial institutions. The keyboard has a 62-key typewriter layout and three sets of function keys. Forty-three of the 45 function keys can be programmed to do specific tasks.

Users of IBM PCs and PC XTs can operate their units as 4700 PCs with any of three optional features that include circuit cards and diagnostic diskettes.

The financial input option allows the attachment of IBM 4700 FCS keyboards, magnetic stripe readers and PIN pads. The input option is standard with the new PC.

Two other optional features can be used with the 4700 PC, PC and PC XT to provide additional functions. A financial output option permits the attachment of a 4700 financial printer, while the financial security option provides encryption and decryption of data.

Programs

Two finance programs introduced today operate with the 4700 PC, PC and PC XT. IBM 4700 Personal Computer Application Services enables these units to transfer data files to and from the 4700 FCS controller. The program also provides storage of PC files on a 4700 controller disk.

BRANCHBANKER 4700 allows financial representatives

Continued on page 80

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Low Cost GPIB

Continued from page 42

instrumentation, process control, robotics, data acquisition, and automated testing. With over 3000 GPIB compatible peripherals presently available, the GP100 provides affordable access to these devices.

The GP100 is a full implementation of the IEEE-488-1980 standard and can be hardware-configured as a talker, listener, or controller. The address decoder maps the device into one of 1,024 I/O port locations; this flexibility in address decoding insures OEM's that the device can be configured to prevent bus contention. The hardware also supports DMA and interrupts, which are jumper-selectable. By utilizing a board-mounted GPIB connector, the GP100 requires no additional cabling and allows the mating connector to seat properly.

The GP100 software gives the user easy access to all bus features by utilizing high-speed assembly language subroutine libraries that can be used with interpretive BASIC, compiled BASIC, FORTH, FORTRAN, and Pascal. From a high level language or assembler program, the user can invoke over 40 high and low level commands in the GP100 Operating System Enhancement. In addition to all GPIB controller/noncontroller functions, the enhancement offers array, string, and single-byte data transfers with DMA. Direct links to the machine dependent code permit the user to create fast and efficient GPIB application software, in contrast to on-board, time-consuming, ROM-based command interpreters.

For more information contact Real Time Devices, Inc., 1930 Park Forest Avenue, P. O. Box 906, State College, PA, 16804, (814)-234-8087.

Mention that you read about it in the **Computer Shopper.**●

IF YOU'RE SERIOUS ABOUT BUYING A PRINTER

We suggest you to do the following four things: (especially if you don't know much about printers.)
(1)Read Consumer Reports, October, 1983.
(2)Gather the specifications and printing samples.
(3)Search for the best interface and cable.
(4)Shop around and compare: add up the total cost of a printer, interface, paper and shipping.
We can help you on (2) and (3), because printers and interfaces are our specialties. In fact, we are continuously testing and evaluating new printers and interfaces. Send $1 for the above information. Please give your computer model and applications.

We offer you the following PLUG 'n' PLAY printer complete packages (you need nothing else) which include:
(1) a printer of your choice,
(2) the best interface with cable of our selection, and
(3) a pack of 500 laser perforated 20# paper.
We guarantee it works beautifully the first time you plug it in and thereafter, because we have tested every interface included in the package. NO guesswork, no fuss. We also customize printer packages to suit your printing needs and applications. Over hundreds of satisfied customers can testify our printer packages are the best in performance and price. Free shipping.

Computer	Interface	STAR SG-10	EPSON LX-80@ (w/tractor)	Panasonic KX-P1091	Panasonic KX-P1092	Citizen MSP-10	Okidata ML192 (New)
Apple II+/IIe	Grafstar II	$319	$349	$359	$459	$399	$459
Apple IIc, IBM PCjr.	S-P Converter						
Atari, TI99/4A	Axiom parallel						
Commodore 64	CardPrint/+G						
Macintosh	HanZon	$359	$389	$399	$499	---	$475#
Timex 2068	Aerco	$305	$335	$345	$445	$385	$445
IBM, Columbia, Kaypro, Sanyo: Cable		$275	$305	$315	$415	$355	$415
Printing speed(cps):draft/NLQ/buffer		120/30/2K	100/16/1K	120/22/1K	180/33/7K	160/40/1K	160/33/8K

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• CDC HALF HEIGHT FLOPPIES	$ 99
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MEMORY CHIPS

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• XEBEC HARD DISK CONTROLLER	$160

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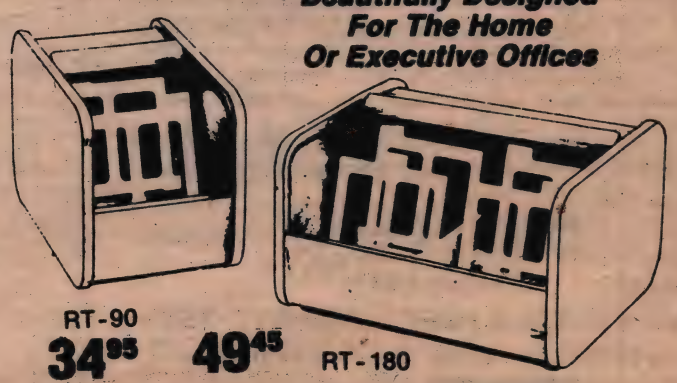

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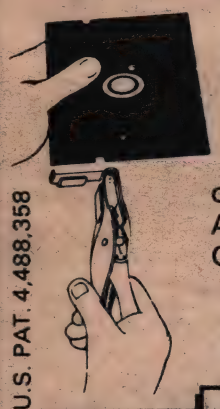

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IBM Announces Fault Tolerant Computer System

IBM announced a fault tolerant computer system designed to provide uninterrupted service to on-line terminal users in banking, retailing, manufacturing and other industries.

IBM System/88 achieves fault tolerance through duplication of system hardware components, including processor, memory and controller. If a component fails, the duplicated component takes over automatically and the system remains available to users for on-line transaction processing.

There are three models of the System/88, with a range of 4 to 16 megabytes of memory. Multiple systems can be connected to allow for application growth.

System/88 can operate as an independent computer and also can communicate with other IBM systems, including System/370 processors.

The new computer includes processors and system software supplied by Stratus Computer, Inc., under a recent agreement that provides IBM with non-exclusive remarketing rights to

Continued on page 82

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Computer Model Continued from page 78

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For further information contact Helen L. Horwitz (914)-934-4825 at the Information Systems Group at International Business Machines Corporation, 900 King Street, Rye Brook, NY, 10573.

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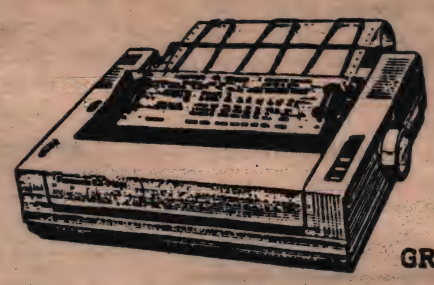

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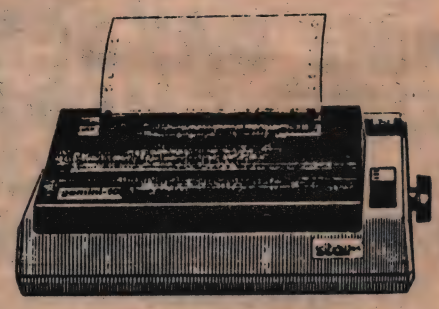

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Continued from page 80

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Ask The Guru
Continued from page 43

from the middle.

Another problem of whole space justification is that it will not usually work with proportional spacing, since there is no immediate way to tell where the end of the line will be. A line with lots of "W" and "M" characters will end up far to the right of a line with lots of "i" characters instead.

In fact, whole space justification can even make things even more ragged than they were with proportional spacing only.

Thus, whole space justification usually only works properly at fixed pitch.

Now, **microjustification** will automatically space out first the words and then, if needed, the individual letters to try and look as much like typeset as possible.

Microjustification is no mean feat, which explains why it is not readily and easily available on most word processors and most printers.

There is all sorts of subtlety involved in microjustification. You usually want to start with the first printing character, so you can have fixed width paragraph indents or outdents yet still have everything else microjustified. Note that any change in character width, boldness or double-striking must be taken into account if everything is to end up properly justified.

Usually, a two-step alogrithm is used to microjustify a line. First spaces are micro stretched, often up to one and a half times their normal spacing. If that does not do it, then individual letter spacing is then microstretched.

Note that you do **not** normally want to microjustify the last line in a paragraph, regardless of its length. Further, if the rest of the paragraph has individual letters, microspaced, chances are you may also want to microspace, but not microjustify, the letters and spaces on the last line.

The closer you get to "real" typesetting, the easier it is to go off the deep end. To do the job right, you should microspace each and every character pair combination for best appearance. This is called **kerning** and is a hallmark of quality text. Commas at the end of the text should be extended slightly to create a **hanging** character, and so on. There is no end to the details like this if you want the job done right.

To have both microjustification and proportional spacing, there has to be some special software or firmware somewhere that has enough smarts to add up all the spacing values, figure out what looks good, and then stretch things out in the best proper way.

That software or firmware must be customized to each and every printer and word processor combination which is why you do not see very much of it.

Very few printers, and even fewer word processors can easily or gracefully handle both microjustify and proportional spacing at the same time.

Wordstar can handle full microjustify and proportional space on many printers. Custom information is needed, available from other **Computer Shopper** advertisers. Applewriter, with some third party WPL routines, can do the same thing and much more, but primarily on the Diablo 630 daisywheel. It can even justify text inside a printed box with fixed margins or can switch between proportional and fixed spacing on the same line for menus, price lists, and such.

Incidentally, per a 1984 survey, these two programs accounted for nearly half of all word processing done on all micros. The installed user base is well over 300,000 for either program.

On the Mac, MacWrite can do proportional spacing and can approximate microjustification. Presently, these features are available only for the Imagewriter or the Laserwriter printers. The algorithm used for microjustification spreads the spaces only. While this limited microjustify does not look too bad for long text lines, short or "narrow-column" text can end up really atrocious.

Awful even.

In general, a high resolution bit mapped display can directly show microjustification, so bit mapped computers, like the Mac, can handle microjustification much easier than can straight text displays.

Lets check a few printers and see what is involved in doing a microjustify. The commands for these are summarized in figure two.

Until the latest of dot matrix printers arrived, the assumption was that if you were using a dot matrix printer, you were not interested in print quality, and thus, there was no point in making microjustification available to you.

Three reasonable printers

Continued on page 83

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Ask The Guru
Continued from page 82

that let you microjustify fairly easy are the Imagewriter, the Diablo 630, and the Laserwriter.

Lets look at each one in turn.

The Imagewriter has internal commands that will carry out the final steps of fill microjustification for you. But note that these commands will NOT do the calculations. To microjustify on an Imagewriter, you must have software internal to your word processor print routines that adds up all the proportional values and decides how much stretching of what is needed.

Another possibility is to create a post processor that reads one line at a time and then does the necessary calculations. While this would work with virtually any word processor that can write a fully formatted file to disk (such as Applewriter's magic "pd8" feature), post processing can be both awkward and slow.

Still, post processing is a very powerful tool that is within the programming resources of just about anyone. More on this some other time.

One Imagewriter command to handle microjustification is "[esc] s n", where n is a number from 0 to 9. This command will set the spacing between characters from 0 to 9 dots.

The usual way to use this command is as follows: First, your word processor must vector to a custom machine language patch that replaces the usual whole space justify routine. Next, you have to calculate the exact number of dots needed in the whole line. This is done by adding up the total number of dots needed by all the characters in the line, allowing for the character widths, imbedded commands, and any changes of fonts or style. A lookup table is needed for this. The number of dots you need is found by subtracting the "actually used" dots from the "total available" number of dots. Then you decide how to "spend" the remainder of the undots.

You should end up with two figures, one that says how far to stretch the spaces, and a second one that says how far to stretch everything else. For instance, you may decide to stretch each space by five dots and each character by one dot. You then replace each space in the line with a "[esc] s 5 [space] [esc] s 1". This will automatically stretch out each space by five dots and the following word by one dot per character.

That will get you a right margin that is only slightly ragged. For an exact fix, you will have to adjust the numbers to come out precisely even. For instance, if you have seven spaces and have to make up 25 dots, you would expand the first four spaces by four dots and the remaining three spaces by three dots.

Things are much less gruesome on the WP enhanced Diablo 630. The enhanced 630 has its own firmware built in for a microjustify. A simple imbedded "[esc] M" will automatically and internally do a complete microjustify, aligning to a previously set right margin.

I have a complete set of routines that will take a stock Applewriter text file, and then invisibly and automatically proportional space, microjustify, rearrange spokes, handle last paragraph lines, center and shadow print titles, double whap, tighten spacing, etc. for the Diablo 630. In fact, this column was written on it, as is nearly everything else I do.

Write or call for more details.

Beware of the words "Diablo Compatible." If there is no "[esc] M" in the instruction set, the printer just plain is NOT Diablo compatible.

A different method can be used to microjustify most any daisywheel, but it requires either post processing or else a machine language patch to your word processor. Virtually all daisies have an HMI, or **horizontal motion index** command. With this command, you can decide how far the carriage will advance after each character. By taking into

Continued on page 84

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Ask The Guru
Continued from page 83

account the character width and how much stretching you want, you can set HMI before each character and thus do a fully microjustified line.

Which would even let you microjustify a fixed pitch wheel.

An alternate to HMI that works with proportional spacing is called offset selection. What offset selection does is decide how much more to go after each proportionally spaced advance. On the Diablo 630, the offset selection is set with an "[esc] [Q] n". "n" here is an ASCII value, rather than a numeric, so you use [A] or "control-A" for a 1, [B] for a 2, [C] for a 3, and so on. For some very strange reasons we will ignore here, a plain "@" will get you back to a normal advance.

Offset selection is not available on most toy daisywheels.

Wordstar does its microjustification by fiddling with individual HMI or offset values. Note that sending HMI values for each character may dramatically slow down print ing. Slowdown will happen unless you use the fastest possible serial baud rates, preferably 9600.

The Laserwriter, of course, is wildly different.

Stunning even.

Proportional spacing on the Laserwriter is normally "free" and always there. Of the hundreds of the stock Postscript processing commands, there is an ASHOW command that adds a selected value to the normal proportional spacing. There is an AWIDTHSHOW command that can take an already justified line and suitably stretch or compact it to fit a larger or smaller space.

There is also a WIDTHSHOW command that will stretch only spaces, or any other single character you pick. Finally, there is an unbelievably powerful kerning command KSHOW. KSHOW will execute a custom procedure between characters that can be as complex or as thorough as you like.

The Laserwriter interfaces beautifully to Applewriter and WPL. WPL speaks Postscript like its native tongue.

Yes, you can do post-processing microjustification out of Applesloth or another BASIC dialect. It would be very slow, but it might be the best way to handle an oddball word processor/printer combination. Once you have what you want, it is an easy matter to do a 100:1 speedup under a machine language rewrite.

What about your printer? If you send me a complete list of the commands and descriptions, I can probably show you what can or cannot be done with it.

Model 28 Teletypes need not apply.

Where Do I Get The Gonzo Inside Info On Applesoft, DOS, ProDOS, or Applewriter?

Getting the real insider information on all the Apple goodies can be a real hassle, There is so much garbage out there masquerading as useful or needed information, and many gaps in what is really needed. And it is often hard to get a straight story about the warts on a product. Or the interface between two competing third-party products. Or the bugs and their fixes. And particularly the buggy fixes that don't apply to you.

That's no bug, it's a feature!

Where to start?

First off, see if you can't beg or borrow a copy of the older **Apple Tech Notes**, published by the **International Apple Core** and available through member IAC clubs. This is a big fat notebook that held the answers to all of the questions actually asked Apple on all their products. While a pre-IIe era book (1981-82), there is lots of good stuff in here, especially the very rare Applesloth material in section 2600.

The best insider book on Applesloth that I know is **All About Applesoft**, published by **CALL A.P.P.L.E.** Included are complete and thorough coverage of all the pointers, variables, memory space, arrays, etc. . ., that you need to know to intelligently use this programming language.

A complete Applesloth source code capturing process that includes extensive and thorough comments is called Applesoft Source Code On Disk, and is available from S-C Software. To avoid copyright hassles, the program requires an Apple with Applesloth in it before it can run. This utility is best used under the S-C assembler, which many consider the finest available.

On to DOS and ProDOS. The best DOS book is, of

Continued on page 85

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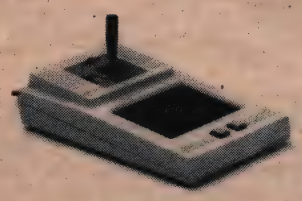

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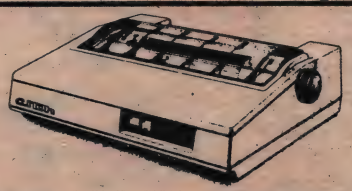

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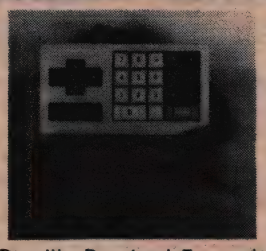

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Ask The Guru
Continued from page 84

course, **Beneath Apple DOS** by Quality Software. All about DOS, again by **CALL A.P.P.L.E.** is another good choice, and the two books very much complement each other. For ProDOS, there's **Beneath Apple ProDOS** by Quality Software, and the **ProDOS Technical Reference Manual (-A2W0010)** directly from Apple. While no All About ProDOS exists at this writing, you'll find excellent tutorial and technical articles on ProDOS scattered throughout various issues of **CALL A.P.P.L.E.**

On Applewriter, there's **All About Applewriter,** again by CALL A.P.P.L.E., the sixteen diskette side Applewriter Toolkit packages by the Gila Valley Apple Growers, and my forthcoming SAMS book, **Don Lancaster's Applewriter Toolkit.**

Turning to on-line resources, the MAUG (Micronetworked Apple Users Group) on Compuserve seems to be the center of the action. There is a bewildering and mind-blowing array of goodies here. The MAUG is currently moving over to the Delphi network as well.

Now for the real insider stuff. You are not supposed to know this, but if you are an Apple developer, a dealer, or a manufacturer of Apple related products, you qualify for access to the AppleLink network. This is where all the inside stuff comes down. And, since this is the first place dealers go for info, if you can get your material into the network, you have "First dibs" on zillions of customers that otherwise would never hear about you.

AppleLink is reasonably open, but since it is primarily a dealer service, they don't want it jammed up forever with zillions of end user requests. Dealers have been told that they may give the access number and the password to a few select customers.

Please, if you access this resource as a user, do so after hours and preferably very late at night.

There is a special AppleLink resource called the Third Party Library that, for a fee, can get your stuff into the pipe.

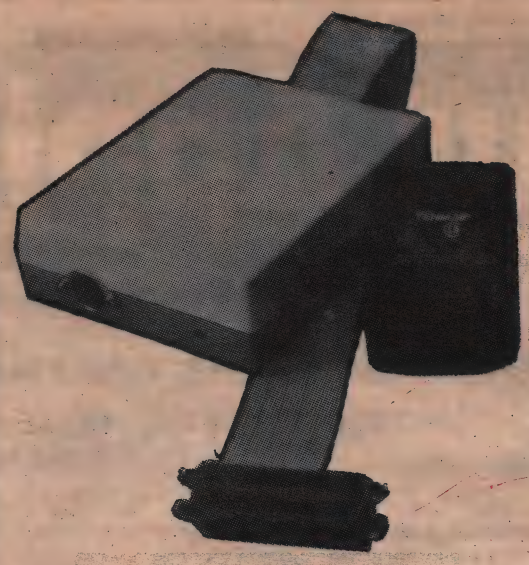
Uh, better not tell them who sent you, but be sure to check it out.

How Do I Shuffle A Deck Of Cards?

The proper name for this sort of thing is called **randomizing without replacement.** Besides the obvious use in card games, the problem also comes up in educational software where you want to give a student a set of problems in random order, yet never repeat or miss.

A first, and incredibly stupid, stab at shuffling might grab a random integer. Then grab a second random integer. Whoops, better check to make

Continued on page 87



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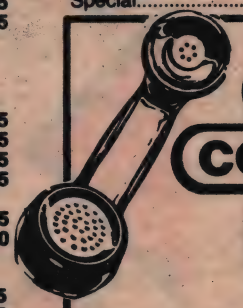

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AD # 12

Ask The Guru
Continued from page 85

sure you did not get the same one over again. Repeat this 52 times for a card deck.

Among the many problems with this route, is that when you get near the end of the deck, you will be throwing hundreds of cards away for each good one you end up with.

This takes forever, even in machine language. In BASIC, it takes forever cubed.

Which might be fine for modeling earth tides, snail geriatrics, or congressional reform, but is nowhere near real time.

Instead, there is a simple, fast and easy way to shuffle n objects. It even got the stamp of approval of the traditional dino people. Even Knuth. What amazes me is how little the method is known or used, and the utterly atrocious substitutes people dream up for it.

Figure three shows details. Assume you have ten objects in ten bins you want to shuffle. Pick a random integer number from 1 to 10. Now interchange what is in bin #1 with whatever bin the random integer points to. If the random integer is also 1, then interchange the contents of bin 1 with itself. Put another way, do nothing if this happens.

Now, grab a second random integer number, this time from 2 to 10, and interchange what is in bin #2 with whatever bin the random integer points to. Repeat the process ten times.

On pass three interchange bin #3 with a bin picked at random from 3 to 10. On pass four, interchange bin #4 with one picked at random from 4 to 10, and so on.

Note that any object can end up in any bin. A few objects might end up back in the same bins, just as you would expect if you shuffled the objects by hand for hours and hours. You could even end up with all the objects back in the same bin where they started. The odds of this happening are, of course, remote.

As most people know, there is a fatal and unfixable flaw in the Applesloth random number generator. Instead, you will get the best and fastest results by using a machine language pseudorandom integer generator.

In fact, on the Apple, a machine language card shuffle happens so fast that you purposely have to slow it down by using a sound effect that sounds just like a shuffling deck of cards. Otherwise, nobody will believe it really happened.

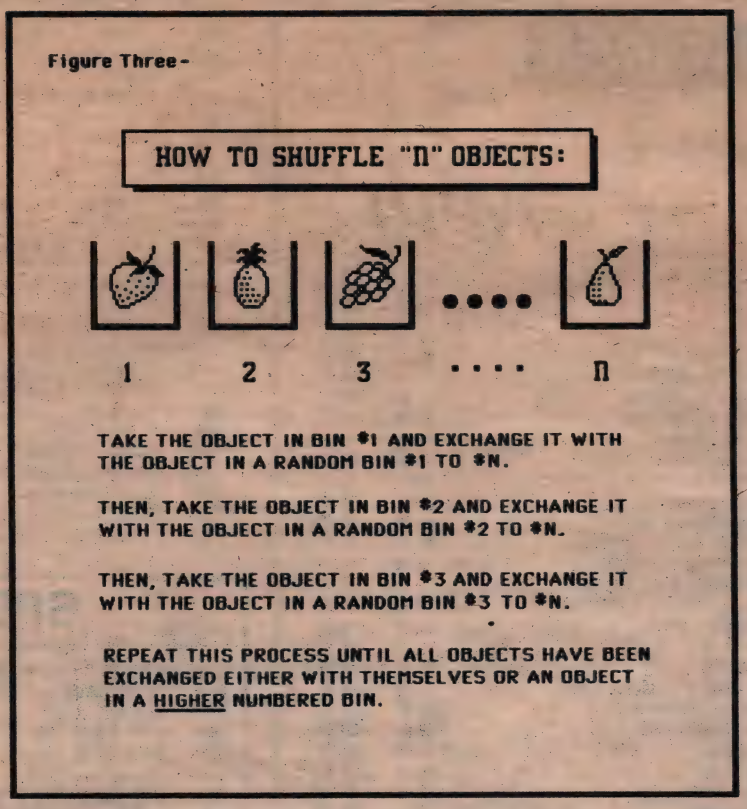
You can even redeal from the same shuffled deck, for replays, repeat student drills, or for industrial "noise that repeats." Complete details on this, including source code, object code, and working programs appear as Ripoff Modules #7 and #8 of my **Assembly Cookbook** (SAMS #22331).

See you there.

And for heavy background theory, check into Knuth's **Art of Computer Programming**, volume II, chapter three. Addison Wesley publishes it and it is an absolute classic.

The Knuth algorithm does have a slight bug in it that introduces some bias if you do not have many bins. Instead, always interchange a bin only with itself or a higher bin. This takes out the bias.

Figure Three-



How Can I Make An Apple II+? Work Like An Apple IIe?

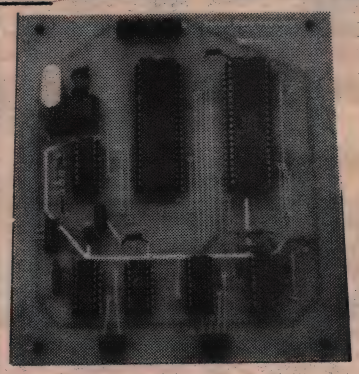
Simply remove the line cord from the II+. Save the line cord and throw everything else away. Then find a IIe that is missing a line cord. Then plug your II+ line cord into the IIe.

The update is that fast and that simple. This route is also far and away the easiest, cheapest, and technically

Continued on page 90

LABORATORY MEASUREMENT AND CONTROL SYSTEM WITH SERIAL INTERFACE TO IBM—PC
(OR ANY OTHER COMPUTER WITH RS—232)

Model DAS 16—4



The DAS 16—4 is a single—board remote data acquisition and control system with serial I/O. This board can remotely acquire sixteen 0—5V analog channels and provides four CMOS digital outputs. It communicates with the IBM—PC over a three—wire RS—232 link to either the COM1 or COM2 communication ports.

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Ask The Guru
Continued from page 87

cleanest as well, resulting in 100% compatibility.

In fact, it is the only way.

What Causes "Disassembly Aliasing?"

A disassembler is some software, firmware, or people-based routine that takes a block of machine language code, and tries to convert it back into assembly language computer op-code listings. Disassemblers are extremely powerful debugging and analysis tools. Examples include the Apple "L" monitor command or Bugbyter for "automated pocket card" disassembly, and programs like RAK-Ware's Disasm IIe that automatically can try to capture source code simply by reading the final ready-to-run object code.

But just about any disassembler for most any computer will sometimes lie like a rug.

You see, a disassembler will only work properly if it starts at a valid entry point in valid working code. If you do not disassemble from a valid entry point in valid working code, you will get **aliasing** in which the disassembler will tell you "that which is not so." The usual signs of aliasing are bunches of question marks denoting illegal op codes, or else unusual op codes working in strange address modes involving bizarre addresses.

Normally, when you first begin a disassembly, you may not know where the valid entry points exist in valid and runnable code. So, you will get bunches of aliases on the first disassembly pass. By carefully studying these aliases and recognizing how and why they occur, you can then make a second pass that gives you a clean disassembly on only the good part of the code.

Recognizing and working with aliasing is thus a very powerful analysis tool.

Lets look at several examples of disassembly aliasing. We'll speak 6502 here, but the same idea will hold for any micro family.

In example one, we have attempted to disassemble a text file of ASCII characters. Since there are no valid op codes here, you get lots of aliasing. Uppercase ASCII text will often be lots of $4X and $5X entries, combined with many $20 spaces and $0D carriage returns. Usually the aliasing will clue you in to the file, and the patterns will tell you whether you have ASCII messages or not. Thus, aliasing is useful to pin down text and disk message files.

In example two, we try to disassemble a list of module address vectors. Once again, we get a bunch of aliases, this time involving off-the-wall operand addresses. Note here the pattern with each second byte being the same number and the addresses usually, but not necessarily always, working their way slowly up through memory. Finding option picking lists is essential to cracking any longer program.

In example three, we disassemble legal code but start at an illegal entry point. The first two or three addresses will alias, but the code usually will straighten itself up and fly right after several lines. The key here is reasonableness. Often, other parts of the code will show you the correct starting point to enter the code. The correct disassembly is also shown here.

Sometimes, a short file will purposely be included imbedded within legal op codes. One text printing scheme, called the **imbedded file method** does this. Others, notably in Appleworks and the Adam's Adventures, will pass parameters that are needed by a subroutine immediately following that subroutine call. The subroutine messes with the stack so that, after grabbing its parameters, it returns to the valid code just beyond the passed values.

The disassembler will usually alias badly on the first pass through an imbedded file.

In example four, we have a very common instance of an imbedded file pair that causes aliasing. This aliasing is caused by ProDOS MLI machine language interface calls. Typically, access of a disk command involves a JSR $BF00 followed by a three byte file. The first byte gives the command. The second byte pair points to a longer file in which more information will appear. Usually this second information file will follow the MLI call. Most MLI calls will end with a branch to an error processor followed by a RTS. The correct and aliased listings are both shown.

Disassembly aliasing can be both a confusing nuisance and an essential tool at the same time.

Lets have a contest. Example five is a mystery aliased disassembly that could only be one possible thing. I'll send a free SAMS book to the first five **Computer Shopper** readers that tell me exactly what that thing is.

Yes, it's a toughie. But you will know for sure when you have it. By the way, the same code is likely to appear in any machine, so it is pretty much microprocessor independent.

Much more information on disassembly techniques appears in the tearing method of **Enhance I** (SAMS -21822) and in my Assembly Cookbook for the Apple II and IIe (SAMS #22331).

And that should do it for this month. By the way, if you ever figure out what it is we are doing here, please be sure and let me know.

But don't tell anyone else. Keep it a surprise. ●

Example One - ASCII MESSAGE ALIASING

```
0E 4C 69   ASL  $694C
6E 65 73   ROR  $7365
20 70 65   JSR  $6570
72         ???
20 69 6E   JSR  $6E69
63         ???
68         PLA
```

Example Two - ADDRESS LIST ALIASING

```
98         TYA
15 43      ORA  $43,X
15 3F      ORA  $3F,X
15 49      ORA  $49,X
15 51      ORA  $51,X
15 75      ORA  $75,X
15 A0      ORA  $A0,X
16 0E      ASL  $0E,X
16 16      ASL  $16,X
16 21      ASL  $21,X
```

Example Three - WRONG START ALIASING

(wrong)

```
7E 6A AD   ROR  $AD6A,X
64         ???
79 D0 0A   ADC  $0A0D
20 7B 10   JSR  $107B
A9 00      LDA  $00
85 21      STA  $21
```

(right)

```
AD 64 79   LDA  $7964
D0 0A      BNE  $7863
20 7B 10   JSR  $107B
A9 00      LDA  $00
85 21      STA  $21
```

Example Four - IMBEDDED VALUE ALIASING

(wrong)

```
20 00 BF   JSR  $BF00
CA         DEX
FF         ???
6E D0 03   ROR  $03D0
60         RTS
```

(right)

```
20 00 BF   JSR  $BF00
CA         DFB  $CA       (command)
FF 6E      DFW  $6EFF     (pointer)
D0 03      BNE  $6ED4
60         RTS
```

Example Five - THE GREAT ALIASING CONTEST

(see text for entry details)

```
32         ???
00         BRK
4B         ???
00         BRK
6E 00 87   ROR  $8700
00         BRK
96 00      STX  $00,Y
2C 01 58   BIT  $5801
02         ???
B0 04      BCS  $1234
08         PHP
07         ???
60         RTS
09 10      ORA  $10
0E C0 12   ASL  $12C0
20 1C 18   JSR  $801C
25 00      AND  $00
4B         ???
```

Here's the names and numbers that got dropped from last month's column. Sorry about that...

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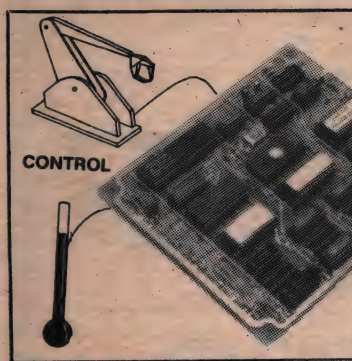

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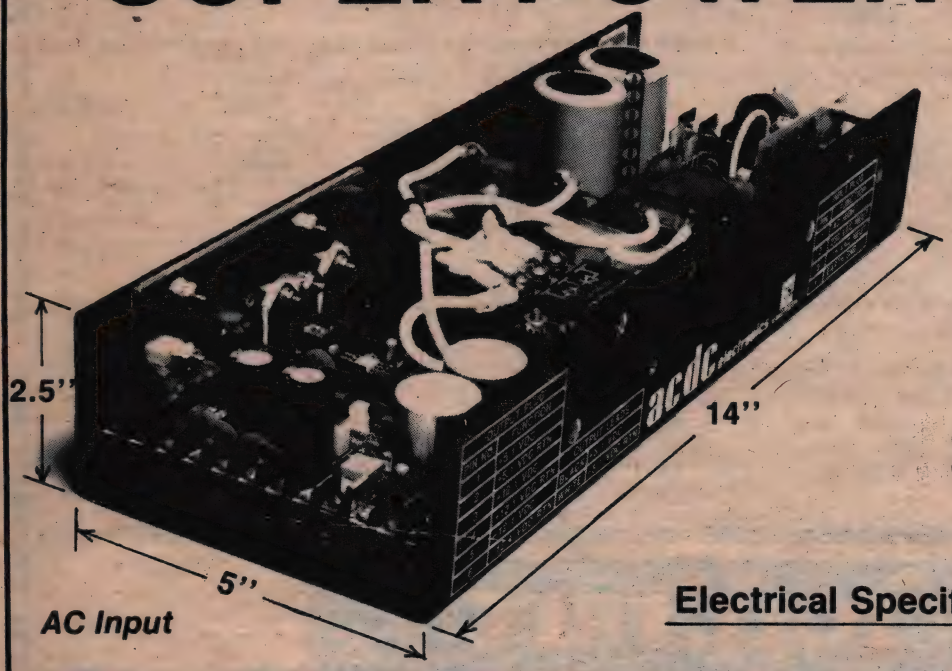

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Orange Micro
Continued from page 44

to utilize complicated printer set-up routines. And the GRAPPLER C is even compatible with software written only for Apple printers. Simple dip switch selection allows full use of most popular parallel printers.

Like the HOTLINK, the GRAPPLER C is fully contained within a cable and simply replaces the standard printer cable. An AC power converter is included as standard equipment, along with easy to understand documentation, and Orange Micro's full one year warranty. Suggested retail price is $119.00.

Orange Micro, located in Anaheim, California, is a major manufacturer of computer enhancement products for Apple, IBM, and Commodore computer systems, including the best selling Grappler line of peripheral products. With over 250,000 in use, the Grappler name has become synonomous with high quality, fully featured interfacing products. Orange Micro products are available through a world wide network of computer dealers. For information or for a dealer near you, contact Orange Micro, Inc., 1400 N. Lakeview Avenue, Anaheim, CA, 92807, (714)-779-2772.

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Zardax Word Processor Version 6.0 For The Apple II

Action-Research Northwest announced a new and improved Zardax Word Processor Version 6.0 for the Apple II, II+, IIe, IIc, and Franklin Ace 1000.

Zardax V. 6.0 is now completely **unprotected**, permitting user back-up and program installation on most hard disk drives using DOS 3.3.

Zardax is a full-function word processor that incorporates mail-merge, a glossary function for frequently-used phrases, on-screen preview for print output, file chaining, and printer spooling. It also features a cut-and-paste function using the disk drive, hard disk, or RAM card (if available in the user's system) as a clipboard. Mnemonic print formatting commands eliminate the need to embed control characters.

The program also includes Zardax Utilities V. 2.0 which enables the program to be configured to over 50 different printers and many printer interface cards. This includes the new ink-jet and laser printers. As in the past, future releases of the Utilities disk will be made available at no charge, upon request by registered owners. A Zardax Lessons disk is also included in the new package. It is used as an interactive training system to instruct the end user in the many functions of the word processor.

A "Trial Size" Zardax is also included. This does everything Zardax can, except print the final document. It will allow

Continued on page 94

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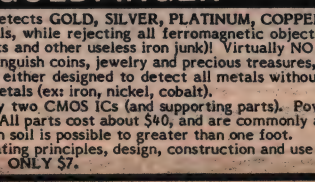

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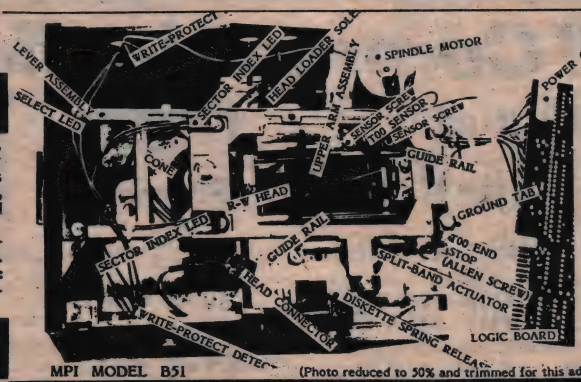

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Macintosh BASIC
Continued from page 45

with GOTO branching is difficult both to read and to debug. Programmers with the "Right Stuff" tend to avoid GOTO entirely, using instead structured branching and looping techniques such as DO, WHILE, FOR, GOSUB, UNTIL, and PERFORM.

Many different unique functions are available to the programmer: ANNUITY and COMPOUND, among other financial functions. Variables can be (with digits of accuracy): extended precision Real (19), double precision Real (15), single precision Real (7), long integer (18), integer (5), and character (3). Numbers up to 1E4932 (a ten followed by 4932 zeros!) can be expressed with the extended precision real variables. The screen accuracy can be set be tween 1 and 19 digits of precision. End user I/O is supplemented by thirteen built-in type fonts (System, Application, New York, Geneva, Monaco, Venice, London, Athens, San Francisco, Toronto, Cario, and Los Angeles), eight type styles (plain, bold, italic, underline, outline, shadow, condensed, and extended), three speaker commands (Sound, Tone, and Volume), and full control over a 496 by 288 graphics screen. The built-in graphics commands include pen size, fill, and various shape commands. Mac BASIC has built-in rectangle, oval, and rounded-off rectangle shapes that can be used to form squares, circles, elipses, and various other figures. Mac BASIC can read the Mac's built-in clock's time and date functions, and a millisecond timer.

Although Mac BASIC contains hundreds of different functions, two common functions found in Applesoft are missing. There are no PEEK or POKE functions. Where an Apple II programmer has to use the command X = PEEK (–16384) to determine the keyboard status, a Mac BASIC programmer uses the command ASK KBD X. The commands ASK and SET with the proper parameters are used to control dozens of different registers. For example: the command SET SHOWDIGITS 19 sets the screen precision to 19 digits, and ASK SHOWDIGITS X will return the value 19.

Mac BASIC is quite fast (it takes four seconds to count to 10,000 as opposed to 14 in Applesoft BASIC on an Apple IIe), but a large number of concurrent programs or large amounts of graphics use can slow it down. Naturally, since Mac BASIC has a large number of commands and can run several programs at the same time, it takes MASSIVE amounts of memory. A FREE command shows only 17K bytes free on a 128K Mac! I highly recommend a 512K Mac for any serious programming with Mac BASIC because Mac BASIC takes 87K of memory.

I reviewed a pre-release version of Macintosh BASIC but there will be (hopefully) several additional functions in the future. My copy of Mac BASIC includes various demo programs which show how an end user program can produce menus, but there are no built-in Menu commands in Mac BASIC. Nevertheless, the manual states that the keywords: CONTROL, MENU, TOOL, TOOLBOX, OUTPUTWINDOW, and WINDOW are not presently used, but are reserved for future use.

Product: Macintosh BASIC

Retail Price: Not Released At This Time

Distributor: Apple Computer
20525 Mariani Avenue
Cupertino, CA 95014
408-996-1010 ●

Zardax
Continued from page 93

dealers and users to give a trial copy of the program to prospective customers, friends or students. Together with the Lessons disk, Trial Size Zardax makes an effective package for instructional use.

Version 6.0 replaces the similar, but copy-protected V. 5.2. Support for the earlier Zardax will continue through June, 1985. An update including the program, Lessons, Utilities, and Trial Size disks is available for $50 to registered owners of the older version.

A separate Zardax version is available for the Apple III SOS operating system. Zardax III works with floppies or Profile hard disk, and Quark's "Catalyst" software, reading and writing either ASCII or Pascal files up to 197K in length.

The list prices of Zardax V. 6.0 and Zardax III are unchanged, at $210.

For more information contact Action-Research Northwest, 11442 Marine View Drive, S.W., Seattle, WA, 98146, (206)-241-1645.

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MacUniverse
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gram is working correctly?" If the answer is no, do not use it.

Problems with LOCK*IT: Recently Assimilation Process released a disk security program called LOCK*IT. This program is supposed to allow the user to add password security to files. The only problem is that it does not always work. Some users reported it trashed their files. Upon investigation I discovered the author had put a message up on Compuserve indicating the program had the following limitations:

(1) If your application is copy-protected (e.g. Multiplan, Ensemble, MacLion), it probably will not work with LOCK*IT. It intercepts the standard I/O calls (Open, Read, Write, Close, GetEOF, etc.). If the application program's copy-protection scheme checks these calls, it will see that they have tampered with and may trash the data file.

(2) LOCK*IT was originally intended for use with disk-based MacWrite and MacPaint. Using it with any other program (regardless of whether or not it is copy protected) on any other is risky. When using it start with a clean disk and copy the System Folder, LOCK*IT, and your application (assuming it's not copy-protected!) onto it. Boot this disk and install LOCK*IT. Before locking important documents for the first time, BACK THEM UP!!

(3) The original LOCK*IT will not work with the new System and Finder 4.1 LOCK*IT, Version 2.0 will.

(4) By the middle of May, the author should have released a public domain application which will (hopefully) recover documents which have been trashed by LOCK*IT.

(5) Using LOCK*IT in conjunction with other utilities which radically modify the System and/or Finder may be hazardous to your disks and your sanity.

So here is your Universe Master's $64 question to Assimilation: "Why did you release this program?" With these limitations, the program is basically useless. The purpose of protecting files to protect them; keeping unlocked backups of data, even in a safe place, defeats the purpose of password protecting files. Surely Assimilation knows this. Also Assimilation should realize that people really want to protect their databases, spreadsheets, and the like; not their MacPaint and MacWrite documents. Finally, I am shocked that Assimilation did not mention these limitations in the documentation. Surely they discovered this early in their beta-testing.

Be a SYSOP?: Do you want to be a sysop of your own bulletin board? Well, you can be for only $39.95. Dream of the Phoenix, Inc. is shipping the Mouse Exchange BBS. The program converts your Mac into an information utility system. It can be a private electronic-mail system, a public news system, a file-distribution system, and the like.

It provides for user security with passwords and a number of security levels. News users can be set up to have access to all or just part of the system.

The electronic-mail capability includes address validation, reply generation, and mail receipt acknowledgement. There is no limit to message size.

The public news system allows the sysop to create a virtually unlimited number of categories to be read or posted. Features include headline scanning, automatic reply generation while reading, and reading specified news articles without pause are standard. Users can specify the starting article to be read, or the program will automatically allow them to read newly posted items.

Data files can be uploaded and downloaded with the file system. They can be organized into any number of directories for categorizing files. ASCII and Macintosh XMODEM protocol are supported.

The sysop can access the Mouse Exchange BBS from either the BBS Mac or a remote site. You can enter the message of the day, change a user's access, delete users and news items, add and change categories or file system directories, and shut down the system.

On your Macintosh the BBS has two windows: a user window so you may observe and chat with the current user, or for local login; and a status window to keep you informed with the current state of the bbs, number of connections and logons since last reset, and user statistics when the user is logged on. A mouse-based sysop program will allow you to easily validate or delete users by date, change categories, or

Continued on page 96

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MacUniverse
Continued from page 95

change configuration information.

The Mouse Exchange BBS is a stand-alone Macintosh application. It can be used on a single drive 128K Macintosh, however, an external drive or hard disk is recommended. Apple or Hayes compatible modem is required. You can get an online demonstration by calling 703-476-9459 on weekends. A functional demonstration disk (local mode only) is available for $10.00.

Compuserve Program of the Month: Finally, before I go, I want to give you my one and only Compuserve find of the month. It is a font called BOSTON.HCX and is distributed on the freeware system. This font produces the best quality printing I have seen on the Imagewriter. It includes many symbols that other fonts forget such as five fractions, greek letters, and legal symbols. Download and try it. Also download the file, BOSKEY.HCX. This will generate a MacPaint cribsheet showing the keyboard layout.

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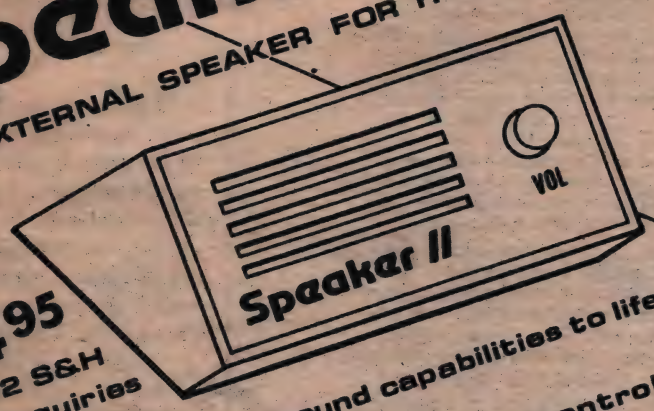

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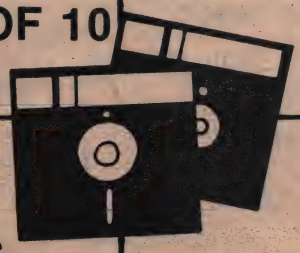

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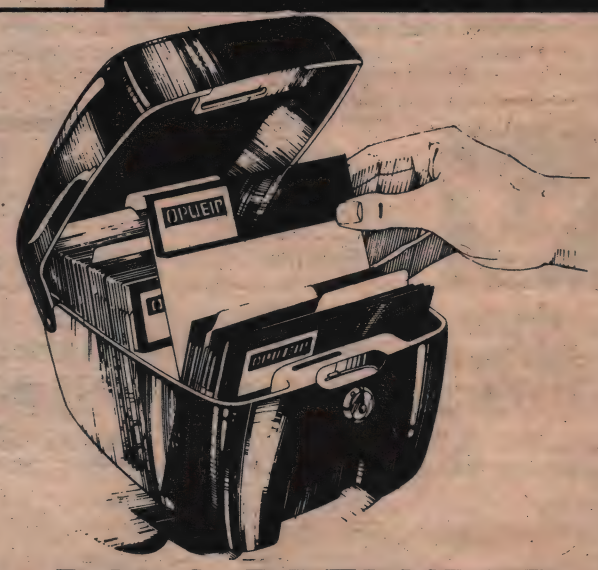

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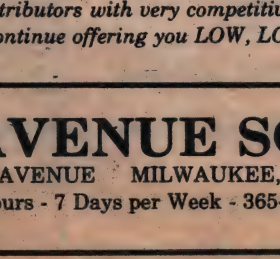

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The PC Spooler Printer Buffer

by Fred Blechman

The PC Spooler is small, simple to use, and inexpensive.

Your printer is probably the slowest part of your microcomputer system. While the printer seems fast at first (even compared to touch typing), you soon find yourself impatiently waiting for the printer to complete a long program LISTing or letter.

Some of the newer dot-matrix printers claim printing speeds of 200 characters per second (CPS) or more, but the specifications can be misleading. While, your computer Central Processing Unit (CPU) might be sending 1000 or more characters a second, the printer is constantly sending interrupt signals to the computer because it can't keep up. Linefeeds and carriage returns all take time, as well as the interpretation and implementation of print formatting instructions. Therefore, the actual printing "thruput" could easily be only 60 CPS, even with a printer rated at 160 CPS.

A "printer buffer" is a hardware device that allows high-speed accumulation of data and commands from the CPU to the printer. The buffer then feeds the data and commands to the printer at the maximum speed the printer can accept, meanwhile freeing the CPU for other tasks.

Some printers contain internal buffers, but these are generally only from 2K to 8K - too small to be really useful. Long tabulations or text files have 15 or 20 thousand or more characters. With microcomputer memories very commonly 32K and above, an 8K printer buffer is just not enough.

Some very "intelligent" external printer buffers have become available in recent years, but most cost $300 and more. They have many software controlled features and formatting capabilities, most of which you probably wouldn't even bother to use, and they require time to learn to program.

However, the PC Spooler, a relatively "dumb" printer buffer, has just become available for $99 for a 16K unit, completely assembled. The 64K model sells for $139. The price

Continued on page 100

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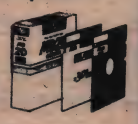

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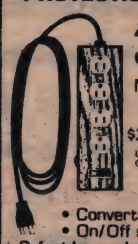

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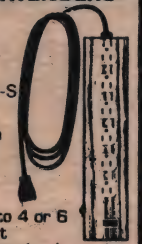

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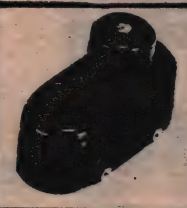

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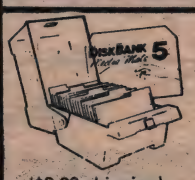

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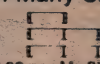

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The PC Spooler
Continued from page 98

includes the connecting cables that usually cost about $30 extra.

Description

Housed in a 4½" by 4¼" by 1½" chocolate brown plastic case, the PC Spooler has an inlayed brushed aluminum coverplate that identifies the functions of two push switches and one light-emitting diode (LED) on the top of the unit. Designed to be used with a Centronics-type parallel interface, a short 36-lead flat ribbon cable extends from the back of the unit terminating in a female Centronics-type connector. A longer cable has a male Centronics-type connector at its end.

Internally, an 8749 microcontroller chip, eight memory chips, and an assortment of other parts, provide voltage regulation, memory storage, addressing and control.

No power is drawn from either the computer or printer. A wall-plug transformer provides 9 volts DC from a 117 VAC source, regulated to 5V inside the PC Spooler.

Simple Installation

The PC Spooler is used with the common Centronics-type parallel interface found on most microcomputer printers. You simply take the parallel cable that normally goes to the printer and instead plug it into the PC Spooler female connector. You then take the male connector from the Spooler and plug it into the printer. Now plug the cable from the Spooler power supply into the back of the Spooler, and plug the power suppy - the wall-plug transformer - into a regular 117 VAC socket. You're all installed!

There is no on-off switch for the PC Spooler. The two top-mounted switches are used to stop/start printing or to clear the Spooler memory. The LED flashes whenever the PC Spooler is receiving a signal.

Using the PC Spooler

The PC Spooler is "transparent" to the user. You just issue printer commands in the normal way, from the keyboard or within a program. There is no "software driver" required, and no special commands. You operate as if the Spooler were not even there. The big difference is that you regain control of the computer long before the printer has completed its job. If you are operating in BASIC, the OK or Ready prompt will appear on your screen almost immediately with a short printing job, or after a delay measured in seconds for a longer job.

Comparison Speed Test

I ran three tests with the PC Spooler, just to show the variation in actual use. The first test (which we'll call Test #1) involved a TRS-80 Model III, using the Zorlof word processor and a text file of 7633 bytes. When Zorlof outputs to the printer, the text is also displayed on the screen, so the transfer time is markedly slower than a non-screen oriented memory dump. Nevertheless, the text file took only 33 seconds to be completely accepted by the PC Spooler. At this point I regained use of the computer to do whatever I wished, since the text file was now in the Spooler, and was being fed to the printer as fast as the printer would accept it.

The printer, a Star Delta-10, which started printing at the beginning of the transfer time, took a total of 120 seconds to print the entire text file - 87 seconds longer than the Spooler. Assuming the actual number of transmitted characters to be around 7700 (because of formatting and command characters embedded in the text file), we have a printer thruput of about 64 CPS (7700/120), although the Delta-10 is rated at 160 characters per second! The transfer rate to the PC Spooler was around 233 CPS (7700/33).

Using the same equipment (Test #2), I printed a BASIC program listing that ran 10,881 bytes. Since this did not appear on the screen, transfer was much faster. It took only 13 seconds for the Spooler to take

Continued on page 101

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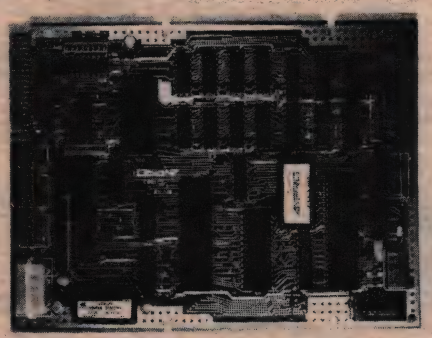

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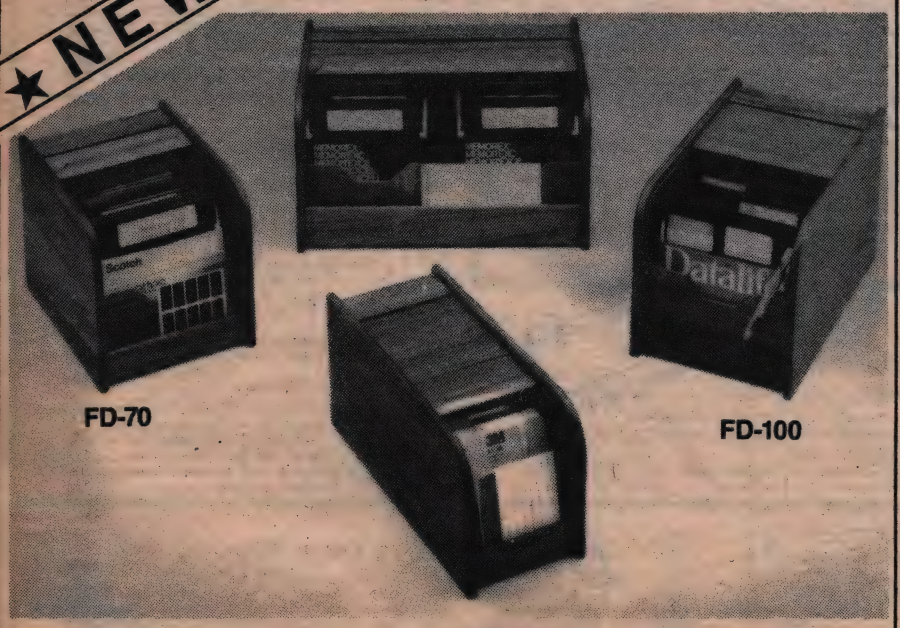

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PC Spooler
Continued from page 100

the entire listing and return control of the computer. That's a transfer rate of 10,881/13, or 837 bytes (characters) per second. Meanwhile, the Delta-10 took a total of 187 seconds to print the entire listing, for a thruput of slightly over 58 CPS (10,881/187).

You might wonder why the printer thruput was not the same as the previous test, since the same printer was used. Some increments of time are involved in line feeds, and the listing (with many short lines) had more line feeds than regular text. Printer thruput is also effected by command codes that require interpretation, as well as the acknowledge and strobe timing of the printer buffer.

I was interested in seeing the PC Spooler performance using completely different equipment. I used a Sanyo MBC 555 microcomputer and the relatively slow (but excellent) CP-80 Type 1 printer, which is rated at 80 CPS. For this test (Test #3) I printed a program listing of 9552 bytes. It took an incredibly long 52 seconds for this listing to be completely accepted by the PC Spooler as the printer trudged along for a total of 280 seconds. This translates to a transfer time to the Spooler of only about 184 CPS, and a printer thruput of about 34 CPS.

Why so slow compared to the TRS-80/Delta-10 combination? I suspected the Spooler was spending most of its time interrupting the printer, and during these interrupt cycles was not able to accept new data. So, I LLISTed again, this time interrupting printer output right at the beginning - and it still took 52 seconds for the computer to dump the entire listing into the Spooler! Apparently, the slowness here is due to the manner in which the Sanyo feeds the parallel interface. Therefore, it's safe to assume you'll get different transfer times with different computers.

Time Saved

While some of these figures may make you wonder if a hardware spooler will really be beneficial, consider the "bottom line" for longer printing tasks. Test #1 saved only 87 seconds on a 7700 character file. However, on a 25K file, the time saving would be about 282 seconds (25000/7700 *87) - over 4½ minutes!

Test #2 offered a better proportional time saving. About 174 seconds was saved printing a 10,881-byte listing, so about 400 seconds (almost 7 minutes) would be saved printing a 25K listing. And that's using a relatively fast printer. With a slower printer, more time would be saved.

Test #3 shows the saving using a slower printer (even with a slower computer-spooler transfer rate). With the 9552-byte listing, the computer was available for use 228 seconds earlier with the Spooler than without. For a 25K listing, the time saved would be 597 seconds, or almost ten minutes!

Can You Live Without It?

A printer buffer is a timesaver. How much time depends on the equipment it is used with, and the amount of printing you do. If your printing tasks are minimal, your time saved will be small. However, if you are frequently involved with print-intensive programs, or word-processing, you'll love having a printer buffer. I don't know of a simpler, less expensive or easier to use buffer than the PC Spooler.

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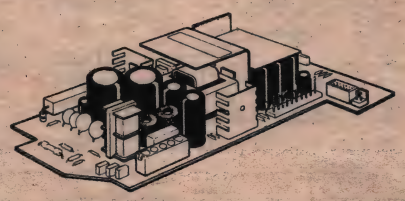

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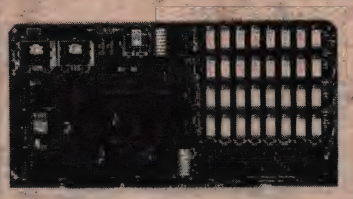

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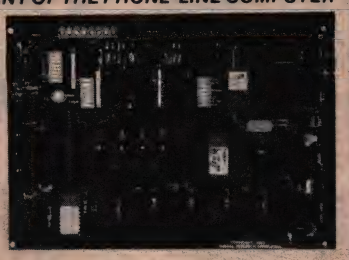

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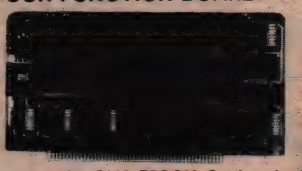

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Beam-Aimer
Continued from page 47

ing east and west, parallel to the equator, but **not** great circles. (The equator, latitude zero, is a great circle.) They are used to specify an angle north or south of the equator, such as "latitude 37.5 N."

A typical spherical triangle is shown, with the North Pole, each corner, each side, and two angles labeled. If point A is your station and point B the target station then side D would be the great circle distance between them, and angle G would be the direction measured clockwise from north. Side F would represent the angle from point A to the North Pole, side E the angle from point B to the North Pole, and angle I would be the angular distance between them at the Pole. These are not important for you to use the program, but they are used in the solution of the spherical triangle, as you'll see (if you stick in there!)

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Input Prompts

Lines 300-430 ask you for the positions of your station and the target station, and the relative direction between them. You'll find that better maps and encyclopedias give locations in latitude and longitude, using degrees and minutes of arc. A last choice is a globe, since you'll have to estimate from the latitude and longitude markings.

The program is designed to handle inputs from either the northern or southern hemisphere, and longitudes east or west of Greenwich - but it can get confused if both the origin and the destination are on the same longitude. In this case, you don't need the program at all, since longitude lines are great circles. One degree of arc is equal to 60 nautical miles, and the direction between them must be 0 or 180 degrees! To use the program if this is the case, however, you may offset either the origin or destination longitude by one degree; the error will be insignificant.

Decimal Degrees

Although earth coordinates are usually specified in degrees, minutes and seconds of arc for longitude and latitude, we will use decimal degrees only. This greatly simplifies the calculations without significantly affecting the accuracy. There are 60 minutes in one degree, and 60 seconds in one minute of arc. For our purposes, you can ignore seconds entirely.

You'll need to convert minutes of arc to decimal parts of a degree for use in this program. One minute of arc equals .01667 degrees. For example, 16 degrees and 42 minutes would be 16.7 decimal degrees. (You multiply 42 times .0167 and get .7). To convert the decimal part of a degree to minutes, divide the decimal by .01667.

Calculating The Results

Line 440 is a delay loop to allow you to see your last input for a short time before line 500 clears the screen. Lines 500 and 510 simply print the information you've already entered, just for confirmation and reference.

The Infernal Triangle

The remainder of the program is concerned with solving the spherical triangle between the North Pole, the origin and the destination, and then printing the results. The REMark statements show the formulae. Lines 600-640 first determine the lengths of arcs F and E, even if they are in different north-south hemispheres. Similarly, lines 650-720 calculate the angle at the North Pole, I, between the origin and the destination, taking into consideration their east-west locations. These calculations are also designed to define the smallest of two possible spherical triangles, since one could go around the globe in a reverse direction!

Lines 800-830 PRINT the "North Polar Angles," and then lines 900-980 get all set up to do the calculation for the length of the arc D. The formula, from a spherical trigonometry textbook, is shown in line 910, with line 920 showing the conversion factor from degrees to radians (since the computer does all trig calculations in radians.) But there's a problem! Many BASICs do not have an ARC-COSINE function (usually called ARCOS or ACS in BASIC.)

Arccosine

Simply stated, arccosine means "the angle whose cosine

Continued on page 104

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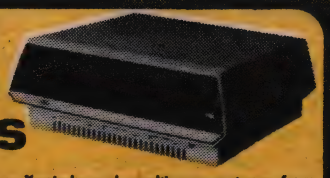

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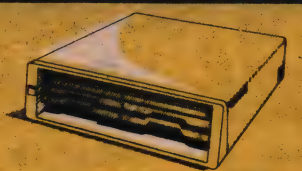

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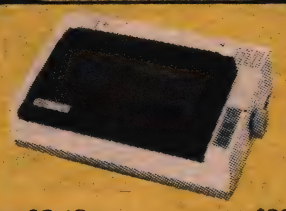

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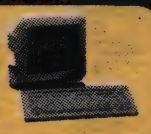

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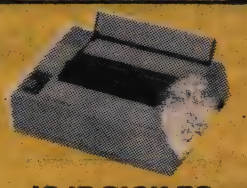

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Beam-Aimer

Continued from page 102

is." It's also sometimes called the inverse cosine. We need to know, in order to solve for variable D, the angle whose cosine is the value that has been calculated for D in line 980.

Since this function is not available in most BASICs, we need a subroutine - and I found one! I retreated to one of my favorite problem solvers, David Lien's "The BASIC Handbook" (CompuSoft Publishing, 535 Broadway, El Cajon, CA 92021, $21.95, postpaid.) This almost-500 page "Encyclopedia of the BASIC Computer Language," as it's subtitled, has "saved my life" several times. It not only explains BASIC terms, but offers routines, such as this one, if your computer doesn't have it built-in.

```
10 REM * COPYRIGHT FRED BLECHMAN 1983 *
20 DIMA(11)
100 CLS:PRINT"      DX BEAM-AIMER PROGRAM"
110 PRINT:PRINT" TO DETERMINE THE GREAT-CIRCLE"
120 PRINT"DISTANCE AND DIRECTION FROM"
130 PRINT"YOUR STATION TO THE TARGET"
140 PRINT"STATION, YOU NEED TO DETERMINE"
150 PRINT"THE LATITUDE AND LONGITUDE OF"
160 PRINT"EACH LOCATION IN decimal"
170 PRINT"DEGREES. THIS CAN BE FOUND FROM"
180 PRINT"A MAP, GLOBE OR ENCYCLOPEDIA."
190 PRINT:INPUT"....press enter to continue....";Z$
300 CLS:PRINT"YOUR STATION (12 CHAR. MAX.)?":INPUTA$
310 PRINT:PRINT"TARGET STATION (12 CHAR. MAX.)?":INPUTB$
320 REM * TRIANGLE DIRECTION *
330 PRINT:PRINT"IS ";B$;" EAST OR"
340 PRINT"WEST OF ";A$;" ?":INPUT"E OR W";P$
350 REM * LOCATION COORDINATES *
360 CLS:PRINTA$;" LATITUDE?":INPUT A(1)
370 INPUT"NORTH (N) OR SOUTH (S)";J$
380 PRINT:PRINTA$;" LONGITUDE?":INPUT A(2)
390 INPUT"EAST (E) OR WEST (W)?";K$
400 PRINT:PRINTB$;" LATITUDE?":INPUT A(3)
410 INPUT"NORTH (N) OR SOUTH (S)";L$
420 PRINT:PRINTB$;" LONGITUDE?":INPUT A(4)
430 INPUT"EAST (E) OR WEST (W)?";M$
440 FOR X=1 TO 200:NEXTX
500 CLS:PRINTA$;" IS ";A(1);J$;" AND ";A(2);K$
510 PRINTB$;" IS ";A(3);L$;" AND ";A(4);M$
600 REM * DETERMINE F & E DEGREES*
610 F=90-A(1)
620 IF J$="S"THEN F=F+2*A(1)
630 E=90-A(3)
640 IF L$="S"THEN E=E+2*A(3)
650 REM * DETERMINE I DEGREES *
660 I=0:IF K$="W" AND M$="W"THENI=A(4)-A(2)
670 IF K$="E" AND M$="E"THEN I=A(4)-A(2)
680 IFI<0THEN I=-I
690 IF K$="E" AND M$="W"THEN I=A(4)+A(2)
700 IF K$="W" AND M$="E"THEN I=A(4)+A(2)
710 IF I>180 THEN I=360-I
720 IFI<0 THENI=-I
800 PRINT:PRINT"NORTH POLAR ANGLES:"
810 PRINT"TO ";A$;": ";F;" DEGREES"
820 PRINT"TO ";B$;": ";E;" DEGREES"
830 PRINT"BETWEEN POINTS: ";I;" DEGREES"
900 REM * ARC D DEGREES *
910 REM COS D=COS E*COS F+SIN E*SIN F*COS I
920 J=.0174533
930 A(5)=COS(E*J)
940 A(6)=COS(F*J)
950 A(7)=SIN(E*J)
960 A(8)=SIN(F*J)
970 A(9)=COS(I*J)
980 D=(A(5)*A(6)+A(7)*A(8)*A(9))
990 C=D:GOSUB2504:Y=W
1000 Y=Y*57.2957
1010 A(10)=Y
1100 REM * CONVERT ARC TO MILES *
1110 REM * 1 DEGREE=60 NAUTICAL MILES ON A GREAT CIRCLE *
1120 PRINT:PRINT"NAUTICAL MILES: ";INT(Y*60*100+.5)/100
1125 REM * STATUTE MILE=1.1515*NAUTICAL MILE *
1130 Y=Y*60*1.1515:Y=INT(Y*100+.5)/100
1140 PRINT"STATUTE MILES: ";Y
1200 REM * POLAR ANGLE G IN DEGREES *
1210 REM COS G=(COS E-COS D*COS F)/(SIN D*SIN F)
1220 A(11)=SIN(A(10)*J)
1230 G=(A(5)-(D*A(6)))/(A(11)*A(8))
1240 C=G:GOSUB2504:Y=W
1250 Y=Y*57.29578:Y=INT(Y*100+.5)/100
1260 IF P$="W" THEN Y=360-Y
1270 PRINT:PRINT"DIRECTION: ";Y;" DEGREES."
1999 END
2500 REM * ARCCOSINE SUBROUTINE *
2502 REM * INPUT C, OUTPUT W *
2504 S=C
2506 GOSUB 2524
2508 W=1.570796-W
2510 RETURN
2524 X=S
2526 IF ABS(S)<=.5 THEN GOTO2556
2528 X=.5*(1-ABS(S))
2530 IFX>0 THEN GOTO 2536
2532 PRINT S;" IS OUT OF RANGE"
2534 STOP
2536 W=X/2
2538 IF W=OTHEN GOTO 2554
2540 Z=0
2542 Y=(X/W-W)/2
2544 IF Y=0 THEN GOTO 2554
2546 IF Y=Z THEN GOTO 2554
2548 W=W+Y
2550 Z=Y
2552 GOTO 2542
2554 X=W
2556 Y=X*X
2558 W=(4.241734E-2*Y+2.399402E-2)*Y+4.552063E-2
2560 W=(((W*Y+.074947)*Y+1/6)*Y+1)*X
2562 IF ABS(S)<=.5 THEN GOTO 2566
2564 W=SGN(S)*(1.570796-2*W)
2566 RETURN
```

Listing 1

Lines 2500 to 2566 are the arccosine subroutine directly from David Lien's book (with his permission). It works perfectly! Notice that the input variable is C and the output is W. Line 990 sets C equal to the value of D calculated by line 980, goes through the subroutine, and then sets Y equal to the result W. So now Y represents the arc D we've been looking for - the distance from your station to the target station. However, Y is in radians, so line 1000 converts this value to degrees, and line 1010 sets A(10) to this value.

Lines 1100 and 1110 point out that this arc is now going to be converted to nautical miles, which are based on degrees of arc of a great circle. Line 1120 calculates and prints the nautical miles in two decimal places, using a common INTeger routine. Line 1125 notes that the number of statute miles equals nautical miles times 1.1515, line 1130 makes this conversion, and line 1140 prints it on the screen.

Direction Between Points

Lines 1200-1260 calculate the direction between the origin and destination, using the formula in line 1210, and the arccosine subroutine in lines 2500-2566. The results are printed by line 1270, and line 1999 ENDs the program before it crashes into the subroutine.

Modifications

If you are a true perfectionist, modify the program to allow input of degrees, minutes and seconds rather than decimal degrees - but be careful about memory use. As shown, this program uses almost 4K of memory. If you have a 16K or larger memory you might wish to add a DATA list of typical locations and their latitudes and longitudes, so that you can type in the city name and have the program look in DATA for the coordinates. For your assistance, Table I shows the approximate geographic coordinates of some well-known cities, and the results using this program on a 4K Radio Shack MC-10 MicroColor computer. You can use these cities and results to practice with and verify the program as it is.

Continued on page 106

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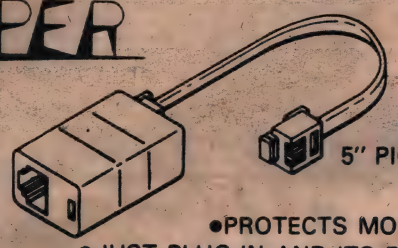

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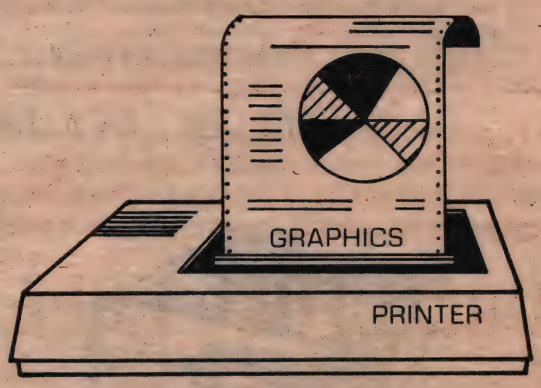

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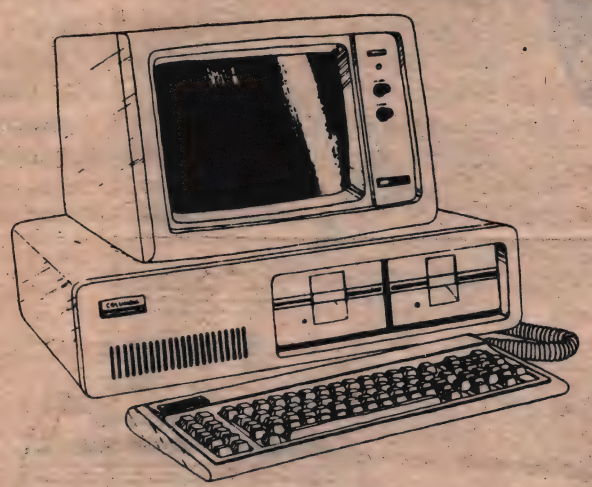

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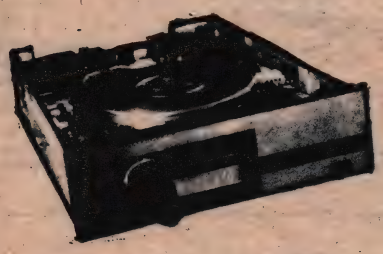

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The Correspondent
Continued from page 106

If you feel you've just got to have commas and colons, change all of the input statements to LINEINPUT. (To clear previously entered text, you just hit the <SPACEBAR> during input.)

After all lines are entered, they are displayed on the screen and you are given the chance to correct any that may have typos or errors. When everything is perfect, you input the number of cards to be printed, position them in the printer, and hit the <SPACEBAR> to begin printing.

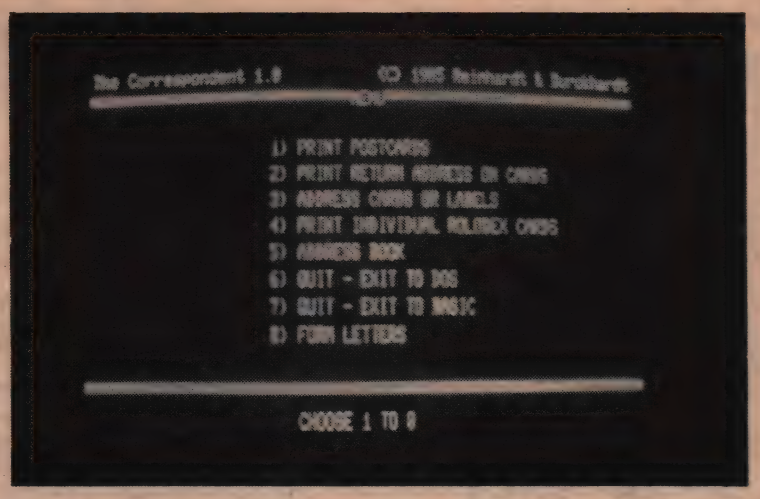
When you are through printing text on the cards, you can turn them over in the printer and print your return address on them by using the "Print return address" option. Mailing addresses can be individually entered and printed using the "Address cards or labels" option and individual rolodex cards can be entered at the keyboard for printing using the "Rolodex card" option. The rolodex cards are printed in condensed type on the MX-80 to fit all of the text on the card. Form-fed rolodex cards should be used. You can also use the "Address cards" option to print addresses on all of your postcards or on mailing labels in zip code order using the mailing list set up with Address Book. The file can be printed out on rolodex cards in alphabetical order using the "Sort and print whole file" option of Address Book.

As mentioned before, the CMD"O" sort is used in these programs. Because TRS-80 Basic lacks an easy way to chain variables from one program to another, the sort routine was included in each of the programs using a sort. Cardwriter and Formletter sort by zip code for mailing purposes, while Address Book sorts by last name for rolodex cards or phone listings.

The final Cardwriter options load Address Book or Formletter, or exit to DOS or Basic.

Get A Disk

The Correspondent, a complete mailing list, form letter generator, postcard writer, and rolodex card printer, as seen in the July and August issues of **Computer Shopper**, is available on disk from the authors. Save yourself hours of typing and order the complete system on a formatted Model III diskette for $15.00 from Richard Burckhardt, 744 Dorchester, Houston, TX, 77022. Please include $1 for postage and handling. ●



Correspondent Menu Screen

Epson MX-80 codes

TABLE 1

Cardwriter:

Lines 330 - 331:	CHR$(27)"W" CHR$(1) (Turns on double-sized print)
	CHR$(27)"W" CHR$(0) (Turns off double-sized type)
Line 5130:	CHR$(15) (Turns on compressed type)
Line 6240:	CHR$(18) (Turns off compressed type)

Address:

Line 1000:	CHR$(18) (Makes sure compressed type is off)
Line 4125:	" "
Line 4215:	CHR$(15) (Turns on compressed mode)
Line 6132:	" "

Formletter:

Line 10298:	CHR$(27)"G" (Turns on double-sized mode for one line)
	CHR$(27)"E" (Turns on enhanced mode)
Line 10400:	CHR$(~~140~~ 12) (Advances to new page)

Comprint:

Line 60:	CHR$(15) (Turns on compressed mode)

TABLE 2 Model III-specific routines

POKE 16916,4	Used in all programs for banner scroll-protection.
CHR$(131)	Used in all programs for menu borders.
CMD"O"	Model III built-in sort. Must replace for Model I.
POKE 16427,75	Sets maximum printer line length to 75.

```
INTRO/BAS
1 CLEAR1000:ER$=STRING$(63,32):Z$=CHR$(34):GOTO5
2 Y$=INKEY$:IFY$=""THEN2ELSERETURN
3 GOSUB2:RETURN
4 FOR X = R TO S: SET(X,T): SET (X,U): NEXT X: FOR Y=T TO U: SET (R,Y): SET (
S,Y): NEXT Y: RETURN
5 CLS: PRINT@209,: S=125: T=0: U=47: R=0: GOSUB 4
6 PRINT@199,CHR$(23)"    THE CORRESPONDENT";:PRINT@541,"by";:PRINT@656,"Karl
J. Reinhardt";:PRINT@732,"and";:PRINT@784,"Richard Burckhardt";:PRINT@852," (
c) 1985";
7 FOR I=1 TO 2000: NEXT I
8 CMD"I","BASIC CARDWRITER -F:1V"
```

Program 1

```
1 REM *CARDWRITER*
8 CLEAR 1000:A1$=STRING$(63,CHR$(131))
9 CLS:PRINT:PRINT"The Correspondent 1.0";:PRINT@96,"(C) 1985 Reinhardt & Burc
khardt":PRINT A1$
10 TB=20:PRINT@157,"MENU":POKE 16916,4:PRINT:PRINTAB(TB)"1) PRINT POSTCARDS"
20 PRINTAB(TB)"2) PRINT RETURN ADDRESS ON CARDS"
21 PRINTAB(TB)"3) ADDRESS CARDS OR LABELS"
22 PRINTAB(TB)"4) PRINT INDIVIDUAL ROLODEX CARDS"
23 PRINTAB(TB)"5) ADDRESS BOOK"
24 PRINTAB(TB)"6) EXIT TO DOS":PRINTAB(TB)"7) EXIT TO BASIC":PRINTAB(TB)"8
) FORM LETTERS":PRINT@896,A1$:PRINT@983,"CHOOSE 1 TO 8"
;
25 CH$=INKEY$:IF CH$="" GOTO 25
26 CH=VAL(CH$)
30 IF CH>8 OR CH<1 THEN 10
40 IF CH=6 THEN CMD"S"
45 IF CH=7 THEN END
60 ON CH GOTO 64,1000,3003,5010,4000,40,45,7000
64 GOSUB 12000;:GOSUB 11010
65 PRINT@397,"INPUT TOPIC LINE (42 CHAR. MAX.)"
66 PRINT@458,">"STRING$(42,"-")"<"
69 PRINTTAB(9):INPUT T$
```

Continued on page 112

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The Correspondent Continued from page 110

```
80 T=LEN(T$)
90 GOSUB 11010
100 PRINT@392,"INPUT THE DOUBLE-SIZED HEADLINE (24 CHAR. MAX.)"
110 PRINT@465,">"STRING$(24,"-")"<"
120 PRINT@528,"";:INPUT HL$
124 T2=LEN(HL$)
130 GOSUB 11010
140 PRINT@321,"ENTER THE TEXT OF YOUR CARD ONE LINE AT A TIME (50 CHAR. MAX).
"
145 PRINT@398,"DO NOT USE COMMAS, COLONS, OR SEMICOLONS."
146 GOSUB 13000
147 GOSUB 12000:GOSUB 11010
150 PRINT@260,"YOU MAY USE UP TO 12 LINES. PRESS <ENTER> AFTER EACH LINE."
155 C1$=STRING$(50,"-")
160 PRINT@325,">"C1$"<"
170 PRINT"1:";:INPUT A$
180 PRINT"2:";:INPUT B$
190 PRINT"3:";:INPUT C$
200 PRINT"4:";:INPUT D$
210 PRINT"5:";:INPUT E$
220 PRINT"6:";:INPUT F$
222 PRINT"7:";:INPUT G$
225 GOSUB 11010;:PRINT@260,">"C1$"<"
230 PRINT"8:";:INPUT H$
250 PRINT"9:";:INPUT I$
260 PRINT"10:";:INPUT J$
265 PRINT"11:";:INPUT K$
266 PRINT"12:";:INPUT L$
269 GOSUB 11010
270 PRINT@256,"1:";A$
271 PRINT"2:";B$
272 PRINT"3:";C$
273 PRINT"4:";D$
274 PRINT"5:";E$
275 PRINT"6:";F$
276 PRINT"7:";G$
277 GOSUB 13000
278 GOSUB 11010:PRINT@257,"8:";H$:PRINT@321,"9:";I$
279 PRINT"10:";J$
280 PRINT"11:";K$
281 PRINT"12:";L$:GOSUB 12000
282 GOSUB 15000
285 IF AN$="Y" OR AN$="y" THEN GOSUB 11010 ELSE GOTO 293:GOTO 293
290 GOSUB 14000:GOTO 310
293 GOTO 800
310 FOR LI=1 TO NU
320 LPRINTTAB((42-T)/2)"--->";T$;"<---"
330 LPRINTTAB((50-(T2*2))/2)CHR$(27)"W"CHR$(1)HL$
331 LPRINT CHR$(27)"W"CHR$(0)
335 LPRINT
340 LPRINT A$:LPRINTB$:LPRINTC$:LPRINTD$:LPRINTE$:LPRINTF$:LPRINTG$:LPRINTH$:
LPRINTI$:LPRINTJ$:LPRINTK$:LPRINTL$
450 FOR L=1 TO 8:LPRINT:NEXT L
480 NEXT LI
482 GOSUB 12000
485 GOSUB 16000:IF AN$="Y" OR AN$="y" THEN 290
490 GOSUB 12000:GOSUB 11010:GOTO 10
800 GOSUB 12000:GOSUB 11010
802 PRINT@281,"EDIT WHICH LINE";:INPUT AN:IF AN<1 OR AN>12 THEN 802
805 PRINT@259,">"C1$"<"
810 IF AN=1 THEN PRINT@320,"1:";:INPUT A$
820 IF AN=2 THEN PRINT@320,"2:";:INPUT B$
830 IF AN=3 THEN PRINT@320,"3:";:INPUT C$
840 IF AN=4 THEN PRINT@320,"4:";:INPUT D$
850 IF AN=5 THEN PRINT@320,"5:";:INPUT E$
860 IF AN=6 THEN PRINT@320,"6:";:INPUT F$
870 IF AN=7 THEN PRINT@320,"7:";:INPUT G$
880 IF AN=8 THEN PRINT@320,"8:";:INPUT H$
890 IF AN=9 THEN PRINT@320,"9:";:INPUT I$
900 IF AN=10 THEN PRINT@320,"10:";:INPUT J$
901 IF AN=11 THEN PRINT@320,"11:";:INPUT K$
902 IF AN=12 THEN PRINT@320,"12:";:INPUT L$
910 GOSUB 12000:GOSUB 11010:GOTO 270
1000 GOSUB 12000:GOSUB 11010:PRINT@967,"PLEASE TURN THE POSTCARDS OVER IN THE
 PRINTER.";
1010 PRINT@256,"INPUT RETURN ADDRESS: "
1020 PRINT"NAME: ";:INPUT N$
1030 PRINT"ADDRESS: ";:INPUT AD$
1040 PRINT"CITY: ";:INPUT CI$:PRINT"STATE: ";:INPUT ST$: PRINT"ZIP: ";:INPUT
ZIP$
1050 GOSUB 12000:GOSUB 11010
1060 PRINT@256,N$
1070 PRINT AD$
1080 PRINT CI$;", ";ST$;" ";ZIP$
1090 GOSUB 15000
1100 IF AN$="Y" OR AN$="y" THEN 1110 ELSE IF AN$="N" OR AN$="n" THEN 1000 ELS
E GOTO 1090
1110 GOSUB 12000:GOSUB 11010:GOSUB 14000
1120 FOR I=1 TO NU
1130 GOSUB 12000:GOSUB 11010:PRINT@283,"PRINTING"
1140 LPRINT N$
1150 LPRINT AD$
1160 LPRINT CI$;", ";ST$; " ";ZIP$
1170 FOR S=1 TO 21
1180 LPRINT
1190 NEXT S
1195 NEXT I
1197 GOSUB 12000:GOSUB 11010
1198 GOSUB 16000
2000 IF AN$="Y" OR AN$="y" THEN GOTO 1110
2010 GOSUB 12000:GOSUB 11010:GOTO 10
3003 GOSUB 12000:GOSUB 11010
3005 PRINT@973,"PRINT <E>NTIRE LIST OR <I>NDIVIDUAL CARDS";:ZZ$=INKEY$:IF ZZ$
="" THEN 3005
3008 IF ZZ$="I" OR ZZ$="i" THEN 3010 ELSE 8000
3010 GOSUB 12000:GOSUB 11010:PRINT@256,"INPUT THE ADDRESSEE"
3020 PRINT"NAME: ";:INPUT N$
3030 PRINT"ADDRESS: ";:INPUT AD$
3040 PRINT"CITY: ";:INPUT CI$: PRINT"STATE: ";: INPUT ST$:PRINT"ZIP: ";:INPUT
 ZIP$
3050 GOSUB 12000:GOSUB 11010:PRINT@256, N$: PRINT AD$
3060 PRINT CI$;", ";ST$; " ";ZIP$
3070 GOSUB 15000
3080 IF AN$="Y" OR AN$="y" THEN 3085 ELSE 3010
3085 GOSUB 12000:GOSUB 11010:GOSUB 14010
3100 GOSUB 12000:GOSUB 11010:PRINT@283,"PRINTING"
3110 LPRINTTAB(20) N$:LPRINTTAB(20) AD$
3120 LPRINTTAB(20) CI$;", ";ST$; " ";ZIP$
3130 FOR S=1 TO 21
3140 LPRINT
3150 NEXT S
3153 GOSUB 12000:GOSUB 11010
3155 GOSUB 16000:IF AN$="Y" OR AN$="y" THEN GOTO 3085
3157 GOSUB 12000:GOSUB 11010
3160 PRINT@970,"DO YOU WISH TO ADDRESS ANOTHER CARD (Y/N)";:AN$=INKEY$:IF AN$
="" THEN 3160
3170 IF AN$="Y" OR AN$="y" GOTO 3010
3180 GOSUB 12000:GOSUB 11010:GOTO 10
4000 RUN"ADDRESS
5010 GOSUB 12000:GOSUB 11010:PRINT@278,"TYPE CARD ROUTINE":LINEINPUT"LAST NAM
E, FIRST NAME: ";AA$
5020 LINEINPUT"ADDRESS: ";BA$
5030 LINEINPUT"CITY, STATE: ";CA$
5040 LINEINPUT"ZIP CODE: ";DA$
5050 LINEINPUT"AREA CODE: ";EA$
5060 LINEINPUT"PHONE NUMBER (EX. 694-1732): ";FA$
5070 LINEINPUT"BIRTHDAY (EX. 11/28): ";GA$
5080 LINEINPUT"COMMENT: ";HA$
5090 GOSUB 15000:IF AN$="N" OR AN$="n" THEN PRINT@256,"REENTER ENTIRE RECORD"
:GOTO 5010
5092 GOSUB 12000:GOSUB 11010
5095 GOSUB 14000
5120 FOR LL=1 TO NU
5130 LPRINT CHR$(15):LPRINTTAB(8) AA$;TAB(53)EA$;"/";FA$
5140 LPRINTTAB(11)BA$
5150 LPRINTTAB(11)CA$;TAB(28)DA$;TAB(53)GA$
5160 LPRINTTAB(14)HA$
6170 FOR L=1 TO 7:LPRINT:NEXT L
6200 NEXT LL
6230 PRINT@970,"DO YOU WISH TO PRINT ANOTHER ROLODEX CARD";:AN$=INKEY$:IF AN$
="" THEN 6230
6240 IF AN$="Y" OR AN$="y"THEN 5010 ELSE LPRINT CHR$(18)
6250 GOSUB 12000:GOSUB 11010:GOTO 10
7000 RUN"FORMLETTER"
8000 CLEAR 28000
8002 GOSUB 12000
8005 PRINT@980,"<P>OSTCARDS OR <L>ABELS";:ZZ$=INKEY$:IF ZZ$="" THEN 8005
8006 IF ZZ$="P" OR ZZ$="p"  THEN PZ=21 ELSE PZ=3
8010 GOSUB 10000
8020 PRINT@284,"SORTING"
8030 DIMA$(700),BZ(700)
8040 FOR I=1 TO LOF(1)
8050 GET#1,I
8060 G$=DA$+"   "+STR$(I)
8065 A$(I)=G$
8066 NEXT I
8070 CLOSE
8075 GOSUB 12000:GOSUB 14010
8080 NZ=I
8085 CMD"O",NZ,A$(1)
8087 FOR I=1 TO NZ
8088 BZ(I)=VAL(RIGHT$(A$(I),3))
8089 NEXT I:GOSUB 10000
8090 FOR I=2 TO NZ
8095 PRINT@283,"PRINTING"
8100 IN=BZ(I)
8110 GET#1,IN
8120 IF LEFT$(AA$,3)="ZZZ" THEN 9500
8130 B1=1
8140 A$=MID$(AA$,B1,1):IF A$="," THEN 8160
8150 B1=B1+1:GOTO 8140
```

Continued on page 114

FasType Continued from page 48

Follow the instructions even if you are moving at a snail's pace at first. As time goes on speed will come if you continue to practice.

The prompt area of the screen displays 9 prompts. FIRST LESSON returns to the first lesson. FINAL LESSON returns to the final lesson. RESUME, PREVIOUS, NEXT, SCAN BACK AND SCAN AHEAD all pertain to manipulation of the various lessons and are easily understood when you are underway in the program. ADD/CHANGE provides the ability to create your own lessons. It will not allow you to change the lessons provided with FasType but to add and change lessons that are appropriate to your own work. The CONTENTS option causes 9 more options to appear. These additional options are easily followed to produce work in the use of the keypad, the four rows of keys on the keyboard and various drills to increase your typing efficiency.

The program is well written and functions without problems. It reacts so quickly that at times I had to stop and look to be sure that the exercise had really changed on the screen as I had finished typing the word or group of words that were displayed. The typing instruction has been done by someone who knows their way around the teaching profession. The lessons include TRSDOS keywords and BASIC statements making this an obvious plus for the computer programmer and user.

A special note to educators. FasType is available in a network version for the TRS80 Network III. Both Model III and 4 versions are included in the network package for the benefit of those that have both model computers mixed in the networks. FasType is soon to be available for the Tandy 2000 and MSDOS computers.

At first I was put off a little by the documentation. It is very sparse. As I used the program it became obvious that the doc's are not only sufficient but very well thought out and written. Any more would be wasted effort. If you want to learn to type, increase your typing ability or cure a lifetime of bad habits, FasType is an excellent way to go.

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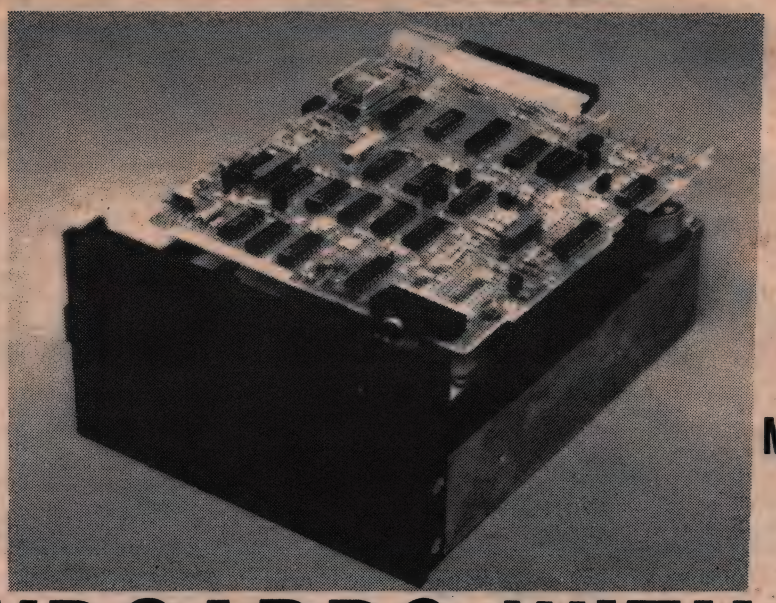

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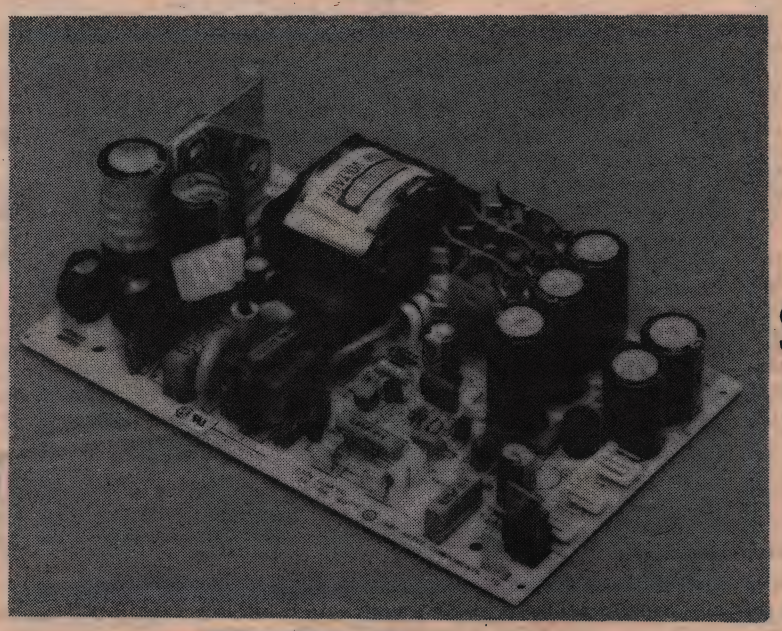

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Program 1, The Correspondent continued from page 112

```
8160 B2=LEN(AA$):B2=B2-B1-1:A1$=RIGHT$(AA$,B2):A2$=LEFT$(AA$,B1-1)
8170 B3=35
8180 B3=B3-1:A1$=LEFT$(A1$,B3)
8190 IF RIGHT$(A1$,1)<>" " THEN 8200 ELSE 8180
8200 LPRINTTAB(20) A1$;" ";A2$:LPRINTTAB(20) BA$:LPRINTTAB(20) CA$;TAB(36)DA$
8210 FOR Z=1 TO PZ:LPRINT:NEXT Z
8220 NEXT I
9500 CLOSE
9510 RUN
10000 OPEN "R",1,"ADDRESS/DAT",153
10010 FIELD #1,34 AS AA$,41 AS BA$,15 AS CA$,7 AS DA$,3 AS EA$,8 AS FA$,5 AS
GA$,40 AS HA$
10020 RETURN
11010 FOR I=256 TO 768 STEP 64:PRINT@I,CHR$(30):NEXT I
11020 RETURN
12000 PRINT@960,CHR$(30);
12010 RETURN
13000 PRINT@982,"<SPACEBAR> TO CONTINUE";:PR$=INKEY$:IF PR$="" THEN 13000
13010 RETURN
14000 PRINT@274,"NUMBER TO PRINT (<0> TO QUIT)";:INPUT NU:IF NU=0 THEN 10
14010 PRINT@974,"PRINTER READY? <SPACEBAR> TO PRINT";
14020 Y$=INKEY$:IF Y$="" THEN 14020
14030 RETURN
15000 PRINT@981,"IS THIS CORRECT (Y/N)";:AN$=INKEY$:IF AN$="" THEN 15000
15010 RETURN
16000 PRINT@976,"PRINT MORE OF THIS CARD (Y/N)";:AN$=INKEY$:IF AN$="" THEN 16
000
16010 RETURN
```

The Correspondent Program 2

```
7900 REM ******************************************************
7910 REM * FORM LETTER GENERATOR              02/03/85       *
7915 REM *       FOR USE WITH THE CORRESPONDENT SYSTEM        *
7920 REM ******************************************************
7925 CLS:PRINT
7930 PRINT"The Correspondent 1.0                <C> Reinhardt & Burckhardt":P
RINT STRING$(63,CHR$(131))
7940 PRINT@153,"FORM LETTER":POKE 16916,4:PRINT:PRINTTAB(20)"1) WRITE LETTER"
:PRINTTAB(20)"2) SORT AND PRINT LETTERS":PRINTTAB(20)"3
) MAIN MENU":PRINTTAB(20)"4) ADDRESS BOOK"
7960 FOR Z=1 TO 5:PRINT:NEXT Z:PRINT STRING$(63,CHR$(131)):PRINTTAB(23)"CHOOS
E 1 TO 4"
7970 CR$=INKEY$:IF CR$="" THEN 7970
7980 CR=VAL(CR$):IF CR>4 OR CR<1 THEN 7930
7990 ON CR GOTO 8010,10005,20000,30000
8000 '==================> TEXT ENTRY MODULE <=================
8010 CLEAR 30000:DIM TX$(25)
8015 CLS
8016 PRINT"ENTER UP TO 25 LINES OF 63 CHARACTERS (</EX>-QUIT,<@>-MENU)"
8020 FOR Z=1 TO 25
8040     PRINT"LINE ";Z
8050     LINEINPUT TX$(Z)
8052     IF TX$(Z)="/EX" THEN 8090
8055     IF TX$(Z)="@" THEN 7925
8060     IF LEN(TX$(Z))>63 THEN PRINT"LINE TOO LONG. PLEASE RE-ENTER." :GOTO
8040
8080 NEXT Z
8090 G=Z:IF G<25 THEN TX$(G)=" "
8091 CLS:FOR Z=1 TO 9
8093     PRINT Z":"TX$(Z)
8094 NEXT Z
8095 GOSUB 11000
8096 FOR Z=10 TO 19
8098     PRINT Z":"TX$(Z)
8099 NEXT Z:GOSUB 11000
8100 FOR Z=20 TO 25
8102     PRINT Z":"TX$(Z)
8103 NEXT Z
8105 PRINT@965,"IS THIS CORRECT (<Y>ES, <N>O, <D>ISPLAY AGAIN, <@>EXIT";:INPU
T AN$
8110 IF LEFT$(AN$,1)="Y" OR LEFT$(AN$,1)="y" THEN 7925
8111 IF LEFT$(AN$,1)="D" OR LEFT$(AN$,1)="d" THEN GOTO 8090
8112 IF LEFT$(AN$,1)="@" THEN GOTO 7925
8120 CLS:INPUT"LINE # TO CHANGE";Z
8122 IF Z=0 THEN GOTO 8120
8125 PRINT Z":"TX$(Z)
8130 PRINT"ENTER NEW LINE":LINEINPUT TX$(Z):GOTO 8091
9999 '============> READ DATA AND PRINT HEADINGS <==============
10010 CLS:PRINT"PLEASE ENTER NAME FOR LETTERHEAD: ";:LINEINPUT LH$
10011 PRINT"ADDRESS: ";:LINEINPUT AD$
10012 PRINT"CITY    STATE    ZIP : ";:LINEINPUT CS$
10013 PRINT"DATE : ";:LINEINPUTDT$
10063 '====================> SORTER <==========================
10070 CLS
10080 GOSUB 10610
10085 PRINT@214,"SORTER IS WORKING"
10090 DIMA$(700),BZ(700)
10100 FOR I=1 TO LOF(1)
10110   GET#1,I
10120   G$=DA$+"  "+STR$(I)
10130   A$(I)=G$
10140 NEXT I
10150 CLOSE
10155 '==================> PRINT LETTER <====================
10160 CLS:PRINT@213,"PRINTER AND PAPER READY?"
10170 PRINT@979,"PRESS <SPACEBAR> TO CONTINUE";
10180 PR$=INKEY$:IF PR$="" THEN 10180
10190 NZ=I
10200 CMD"O",NZ,A$(1)
10210 FOR I=1 TO NZ
10220   BZ(I)=VAL(RIGHT$(A$(I),3))
10230 NEXT I
10240 GOSUB 10610
10250 FOR I=2 TO NZ
10260    CLS:PRINT@213,"      PRINTING
10270   IN=BZ(I)
10280   GET#1,IN
10290   IF LEFT$(AA$,3)="ZZZ" THEN 10500
10291 B1=1
10292 A$=MID$(AA$,B1,1):IF A$="," THEN 10294
10293 B1=B1+1:GOTO 10292
10294 B2=LEN(AA$):B2=B2-B1-1:A1$=RIGHT$(AA$,B2):A2$=LEFT$(AA$,B1-1)
10295 B3=35
10296 B3=B3-1:A1$=LEFT$(A1$,B3)
10297 IF RIGHT$(A1$,1)<>" " THEN 10298 ELSE 10296
10298 T2=LEN(LH$):LPRINT CHR$(27)"G":LPRINT CHR$(27)"E"
10299 LPRINTTAB((64-(T2+2))/2)CHR$(14)LH$:LPRINTTAB((64-LEN(AD$))/2)AD$:LPRIN
TTAB((64-LEN(CS$))/2)CS$:LPRINT:LPRINT:LPRINT:LPRINT:LP
RINTTAB(50)DT$:LPRINT:LPRINT:LPRINT
10300   LPRINT A1$;" ";A2$::LPRINT BA$:LPRINT CA$;TAB(16)DA$
10310   LPRINT:LPRINT
10340 LPRINT"Dear "A1$":"
10350   LPRINT
10360   FOR Z=1 TO G-1:LPRINT TX$(Z):NEXT Z
10370   LPRINT:LPRINT:LPRINT
10380   LPRINTTAB(50)"Sincerely,"
10390   LPRINT:LPRINT:LPRINT:LPRINTTAB(50)LH$
10400   LPRINT CHR$(12)
10410 NEXT I
10500 CLOSE
10510 RUN
10600 'OPENS FILES
10610 OPEN "R",1,"ADDRESS/DAT",153
10620 FIELD #1,34 AS AA$,41 AS BA$,15 AS CA$,7 AS DA$,3 AS EA$, 8 AS FA$, 5 A
S GA$, 40 AS HA$
10630 RETURN
11000 PRINT@979,"PRESS <SPACEBAR> TO CONTINUE";
11005 PR$=INKEY$:IF PR$="" THEN 11005
11006 CLS
11010 RETURN
20000 RUN"CARDWRITER"
30000 RUN"ADDRESS"
```

```
1 REM ----------=====DELETE/BAS=====----------
5 REM SET DELETE PROGRAM TO 2 VARIABLE FILES
10 CMD"I","BAS.C DELETE -F:2V


10 REM ******************************************************
20 REM *              DELETE RECORD UTILITY                 *
30 REM *                      FOR                           *
40 REM *               THE CORRESPONDENT                    *
50 REM ******************************************************
1000 CLS:CLEAR500:A$=STRING$(63,CHR$(131)):B$=STRING$(63," ")
1002 PRINT
1005 PRINT"The Correspondent 1.0          (C) 1985 Reinhardt & Burckhardt":PRINT STRING$(63,CHR$(131))
1010 PRINT@153,"DELETE UTILITY"
1020 POKE 16916,4:PRINT
1030 PRINT@960,A$
1100 GOSUB 14010
1110 GOTO 14030
14000 'OPENS FILES
14010 OPEN "R",1,"ADDRESS/DAT",153
14020 FIELD #1, 34 AS AA$, 41 AS BA$, 15 AS CA$, 7 AS DA$, 3 AS EA$, 8 AS FA$, 5 AS GA$, 40 AS HA$
14025 RETURN
14030 PRINT@330,"ENTER RECORD # TO DELETE (<999> TO ABORT): ";:INPUT B1
14031 IF B1=999 THEN CMD"I","BASIC ADDRESS -F:1V"
14035 IF B1<1 OR B1>LOF(1) THEN 14030
14037 GOSUB 14040:GOTO 14055
14040 OPEN "R",2,"ADDRESS/NEW",153
14050 FIELD #2,34 AS RA$,41 AS RB$,15 AS RC$,7 AS RD$,3 AS RE$,8 AS RF$,5 AS RG$,40 AS RH$
14053 RETURN
14055 GOSUB 16000
14060 FOR B=1 TO LOF(1):IF B=B1 THEN NEXT:GOTO 15000
14070 B2=B2+1:GET 1,B:LSET RA$=AA$:LSET RB$=BA$:LSET RC$=CA$:LSET RD$=DA$:LSET RE$=EA$:LSET RF$=FA$:LSET RG$=GA$:LSET RH$=HA$
14080 PUT 2,B2:PRINT@346,"RECORD #";B;:NEXT
15000 CLOSE 1,2
15010 KILL "ADDRESS/DAT"
15020 GOSUB 14040
15030 GOSUB 14010
15060 REM ----------=====COPY FILE=====----------
15065 GOSUB 16000
15067 PRINT@346,"COPYING FILE"
15070 FOR R=1 TO LOF(2)
15080 GET #2
15090 LSET AA$=RA$:LSET BA$=RB$:LSET CA$=RC$:LSET DA$=RD$:LSET EA$=RE$:LSET FA$=RF$:LSET GA$=RG$:LSET HA$=RH$
15105 PUT #1:PRINT@410,"RECORD #";R
15110 NEXT R
15120 CLOSE 1,2
15125 GOSUB 16000
15130 KILL"ADDRESS/NEW"
15140 PRINT@394,"          DELETE ANOTHER RECORD (Y/N)";:INPUT AN$
15150 IF AN$="Y" OR AN$="y" THEN RUN ELSE CMD"I","BASIC ADDRESS -F:1V"
16000 FOR I=256 TO 768 STEP 64:PRINT@I,B$:NEXT I
16010 RETURN
```

Continued on page 186

Windows for TRS-80
Continued from page 48

is press the Down-Arrow, Shift and "N" keys at the same time.

When Windowpad appears, the up and down arrows are used to cursor up and down the Master Menu or List Menu, the left arrow is used to backspace and erase, the numbers 1-6 are used to designate the note page and lines in the notes can be edited using the numbers 1-3.

The Master Menu will be the first thing you see in a little window appearing over your application program screen. The three options allow you to list your notes (up to six), edit your notes, or write notes. If you select the write option, you are asked for the page to write the note on. After giving the page number, you can write a note with up to three lines of 23 characters on each. When you are finished, you are asked if you would like to be reminded of the note at a certain time. This allows you to set Windowpad to display the note at a designated time like a silent alarm clock.

When you are finished, you are returned to the Master Menu. To return to your application program, you would select the List function on the Master Menu and then Escape on the List Menu. You are then returned to your program with its screen intact.

Editing is done either by typeover or by entering new lines. Since theee are only 23 characters each, the latter is probably easiest.

Using the List functions, up to eight windows can be displayed at once - the Master Menu, List Menu and six pages of notes.

Windowpad is really a neat little program, and at $21.25, it's not over-priced. It's fun to play around with, but fairly limited in actual utility. You'd be surprised at how little six pages of 69 characters actually hold.

If what you are looking for is something to prove to your friends that windowing is possible on the good old TRS-80, Windowpad is an inexpensive solution. If it's a real note writing utility you are looking for, buy a pencil and paper.

Windowpad Note Processing Utility
En Fleur Corporation
2494 Sun Valley Circle
Silver Spring, MD 20906
301-598-4532

TRS-80 Model I, III/4
Versions Available For 16K, 32K and 48K
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Fast Load Vs. Mach 5

A Review by
Cheryl Peterson

Both these packages contain cartridges that make accessing the Commodore 1541 disk drive easier and faster. By using a simplified command structure, files can be loaded, saved, scratched, renamed or copied to another disk. If a new disk needs to be formatted, that command is available as well.

Both have two stroke directory options. Fast Load requires pressing British pound symbol and then the A key. Mach 5 takes a $ followed by a RETURN. Both have options to send open and close commands directly to the drive.

Both can be disabled and then re-enabled.

As you can see from Table 1, having the cartridges load software can make a large difference in the amount of time you have to wait before using some programs. For others though, little improvement is shown. Both programs speed up load time for packages that are mostly PRG (program) files. The cartridges have little effect on programs that make extensive use of SEQ (sequential) files. Both take approximately the same time to load in software.

Both have very limited documentation. A couple of pages outline the various commands available and what they do. Neither goes into great detail about the prompts that should appear on the screen, whether you need to swap disks, etc.

And that's where the similarities end. Each program offers a few extras that the other doesn't have.

Fast Load's Extras

Fast Load has one convenience that I really liked. If the program you want to run uses the standard load command 'Load"*",8,1' pressing the Commodore key and the RUN key simultaneously will autoload the program.

Fast Load has a disk utility that allows you to look at and modify any track and sector location. It also allows you to lock a file so that it is read only.

Fast Load includes a disk copying routine, so you can make backup copies of your data disks. For a really fast copy, the cartridge includes a BAM (Blocks Allocated and Marked) copy. This routine copies only the blocks that have valid data on them. By not copying empty tracks and sectors much time can be saved. Fast Load will not make usable clones of copy protected disks, so don't be surprised when it won't duplicate many commercially marketed packages. It is not meant as a piracy tool.

In conjunction with the weakness of the documenta-

Continued on page 155

New Multi-User Tandy 6000

Continued from page 48

microprocessor - the Z-80A - handles input/output. This technology permits the 6000 to process data at higher speeds.

A high-resolution 12-inch green video display provides 24 lines of 80 characters. The detachable typewriter-style keyboard has a numeric keypad and eight function keys.

The Tandy 6000 computer is offered with two built-in 1.25 megabyte double sided, double density 8-inch floppy disk drives (26-6021, $4,499) or with one floppy disk drive and an internal 15-megabyte hard disk drive (26-6022,$5,499). The hard-disk drive version is a full thousand dollars less than last year's equivalent Model 16B.

Additional memory may be added with the 512K Memory Kit (26-6016, $849) via the user-accessible card cage. The two floppy disk drive version may be expanded with up to four external 35-megabyte hard disk drives for up to 140 million characters of storage. A single 35-megabyte hard disk may be added to the Tandy 6000 computer with built-in hard disk drive.

All Model II, 12 and 16 computers can be upgraded to

Continued on page 116

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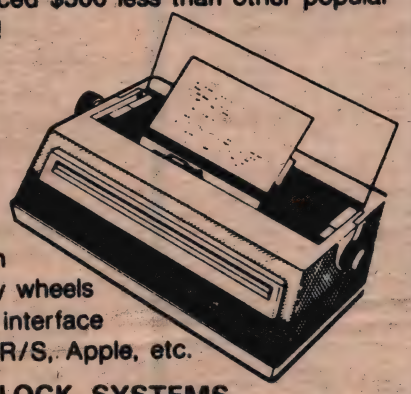

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New Multi-User Trandy 6000

Continued from page 115

Tandy 6000 computer capabilities. The Model 12 computer to Tandy 6000 Upgrade (26-6014, $1,595) includes a 68000 processor board and 512K RAM board as well as the XENIX 3.0 core (700-3030).

The Tandy 6000 computer is available at Radio Shack Computer Centers and participating dealers nationwide.

The Tandy 6000 Computer Fact Sheet

1) The newest XENIX operating system computer from Tandy Corporation.

2) Features XENIX 3.0, the latest multi-user operating system from Microsoft.

3) Operates at approximately twice the speed of the equivalent Model 16/16B, according to Tandy's benchmark tests.

4) Standard memory on the Tandy 6000 computer is 512K RAM, expandable to a maximum of one megabyte.

5) Three to six employees can access a single Tandy 6000 computer at one time using inexpensive terminals.

6) The optional printer, modem and other accessories can be shared by everyone on the system.

7) Any Model 12, Model 16 or Model 16B may be expanded to Tandy 6000 capabilities.

8) Available at Radio Shack Computer Centers and participating Radio Shack Dealers nationwide.

The Software

1) Can use software designed to take advantage of the Tandy 6000 computer's advanced features as well as Model 16 computer software.

2) Multi-user business programs for the Tandy 6000 computer include: Multi-User Profile, Multi-User Scripsit, General Ledger, Inventory Control System, Accounts Receivable, Sales Analysis, Manufacturing Inventory System, Order Entry/Inventory Control System, Unify, Multiplan, Job Costing, Payroll, Accounts Payable.

3) XENIX Languages for the Tandy 6000 computer include: XENIX Development System, FORTRAN 77, Pascal-2, XENIX COBOL Development System, XENIX BASIC Interpreter, Macro Assembler.

The Hardware

1) Operates on an 8 MHz MC 68000 16/32-bit microprocessor and a 4 MHz Z-80A 8-bit microprocessor.

2) Offered in two basic configurations: 2-Disk Tandy 6000 (with two 8-inch floppy disk drives) - $4,499.00; 512K Tandy 6000 With Built-In Hard Disk (15 megabyte hard disk with one 8-inch floppy disk drive) - $5,499.00.

3) Both configurations include: 512K RAM, expandable to one megabyte, 82 Key professional keyboard, including numeric keypad, and eight programmable function keys, and High Resolution 12 inch green display monitor with 80 or 40 characters per line by 24 lines.

4) Expansion Options: 512K Memory Kit - $849.00, RS-232 Card - $199.00.

5) Model 12/16 Upgrades: 512K RAM Board - $1,095.00, Model 12 to Tandy 6000 upgrade - $1,595.00, XENIX V7 to 3.0 Core Upgrade - $199.00.

5) Data Terminals: DT-100 Deluxe Data Display Terminal (with 14-inch high resolution screen displays 80 or 132 columns by 26 lines, Low-profile, sculptured keyboard with 16 programmable function keys - $795.00); and DT-1 Terminal - $599.00. ●

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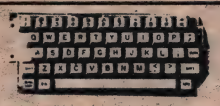

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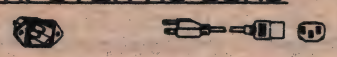

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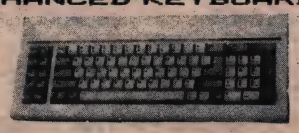

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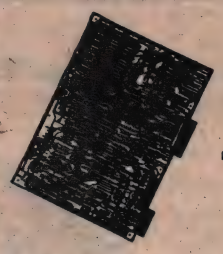

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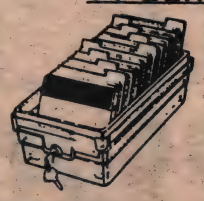

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Magic Math Plus

A Review
by Richard Burckhardt

I am one of these people who never really enjoyed math in school. While I could breeze through every other subject, math always gave me the hardest time. So hard, in fact, that I would go out of my way to avoid anything resembling it.

With this in mind, you can probably imagine my reaction to receiving a copy of Magic Math, a collection of short educational programs demonstrating various mathematical applications from a company called Recreational Mathemagical Software. Just the word "math" flooded my mind with all those horrid memories of geometry, algebra and trigonometry which followed me through school.

For several weeks, I bypassed this particular disk when flipping through my pile of software to be reviewed. I finally decided that I was being silly and should get it over with, so I booted the Magic Math disk.

The physical package is nothing much to look at, just a diskette with one sheet of documentation detailing the disk loading instructions. The disk comes with XDOS, a TRDOS compatible mini operating system which allows you to boot and run immediately. XDOS is different enough, though, to prevent any of my disk index programs from reading it.

The programs are loaded and run through four menus, Volume 1, 1b, 2 and 2b. There are also several "bonus" programs which do not show up on any of the menus, but can be displayed through a DIR from DOS or by using an option on one of the menus to display all programs on the drive. These extra programs have a /BON extension (for BONus).

Some of the programs return you to one of these menus upon completion and some don't. This inconsistency was my first complaint. One additional line in each program would make using the package a lot easier.

Volume 1 includes Fast Loan Amortization, Triangle Number Trick, Base Two Trick, The Remarkable Number 153, Kapreker's Constant, The Game of N, Digit Prediction, Additive Sequences and Mind Reading. I'm not really sure what the loan amortization program is doing in there. All of the other programs are strictly for educational purposes, while the loan amortization program is more utilitarian.

Volume 1b includes The Counterfeit Gold Coins, The Eccentric Jailer, Still More Mind Reading, A Prime Number Producer and Super Blackjack.

Volume 2 gives us the ever-popular Hexapawn, along with Roman Numerals, Palindromic Number Conjecture (I couldn't wait to try this one out. With a name like that, it had to be fun), Prime Number Sieve, Octa, The Collatz/Ulam Conjecture and Kaprekar Revisited.

In Volume 2b we get Evenodd, Number Guesser, Bubble Sort Demo, Repeater Game, Repeating Decimal to Fraction, The Game Thirty-1 and Square.

The bonus programs, some

Continued on page 121

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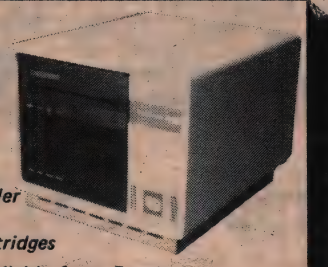
Solo 50MBy SASI System



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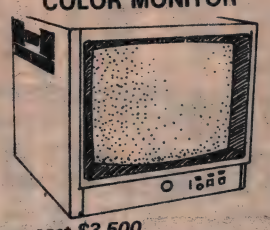

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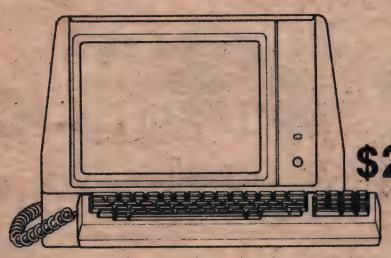

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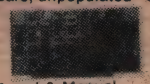

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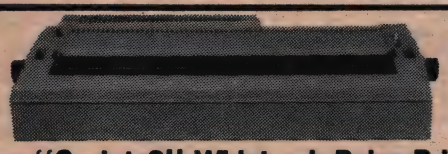

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- New, unused, in orig'l boxes
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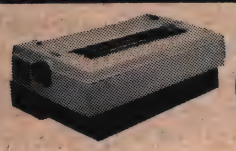

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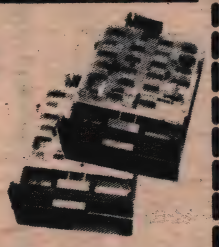

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```
>>> GAME OPTIONS <<<

A---Advance Review        J---J'stick/Arrow Speed    S---Swap Sides
B---Backup Mode           K---Kibitz Move            T---Turn Board
C---Clock Timing          L---Playing Level          U---Undo Cursor Hook
D---Disk Acess            M---Manual Mode            V---Main Variation
E---Position Entry        N---Notation Style         W---Wake up Buzzer On/Off
F---Move Flash Count      O---Opening Style          X---Auto Execute Mode
G---Start New Game        P---Print Board            Z---Mid-game Zeal
H---Game History          Q---Quit Program
I---Instructions          R---Review Mode On/Off

>>> ENTRY MODE OPTIONS <<<

B---Enter Bishop at Cursor   G---Start New Game        M---Moved King/Rook
C---Change Piece Color       I---Instructions         N---Enter Knight at Cursor
D---Delete Piece at Cursor   J---Joystick/Arrow speed  P---Enter Pawn at Cursor
E---En Passant Pawn          K---Enter King at Cursor  Q---Enter Queen at Cursor
F---Move Flash Count         L---Playing Level        R---Enter Rook at Cursor

S---Set up Normal Position   W---Wake Up Buzzer On/Off  <ENTER>---Start Game
T---Turn Board               Z---Zero Board
```


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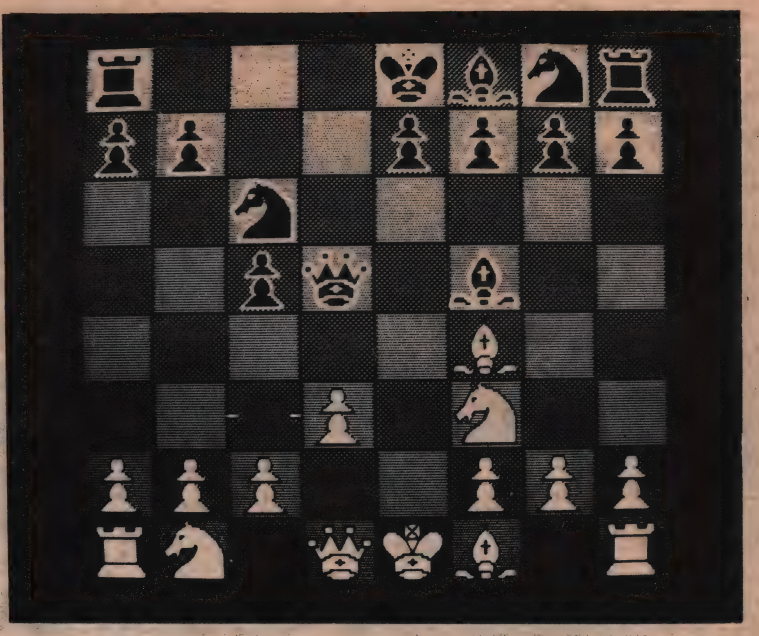
Tournament Chess
Continued from page 48

get to the ENTRY MODE OPTIONS by pressing "@". Some of the options are available only at the start of the game. Others are accessable at any point as you proceed with the game you are playing.

As the Chess board is displayed on the screen there is other information displayed at the top, bottom and side. The top and bottom of the screen indicate whose turn it is at the moment. The side of the screen is reserved for status and activity information such as the current turn number, playing level (0-9), number of turns and time remaining, and other information required as the game progresses.

Most of the options are easily understood. A short run through will show that SWAP allows you to change from black to white and vice versa: BACKUP allows you to take back as many previous moves as you desire; WAKE-UP allows you to change the status of the buzzer that alerts you that it is your turn to move: MANUAL on/off puts you in the position of making moves for both sides instead of just one while the computer makes the other move: AUTO option puts the computer in the control seat and it plays both sides of the game; REVIEW does just what it sounds like it will, reviews the game played move by move; DISK ACCESS provides five options - (1)F displays the file names on a diskette. (2)S saves the current game. (3)L loads a game from diskette. (4)K will kill a file and (5) BREAK to resume playing. PRINT BOARD prints the displayed board on a parallel printer. H and then P prints the game's history.



Print out of game start from high res screen

```
                    Black

 BR | BN | BB | BQ | BK | BB | BN | BR   Turn      Skill
----+----+----+----+----+----+----+----   1       Level 1
 BP | BP | BP | BP | BP | BP | BP | BP
----+----+----+----+----+----+----+----  ----------------
    |    |    |    |    |    |    |
----+----+----+----+----+----+----+----  Search depth:
    |    |    |    |    |    |    |      ----------------
----+----+----+----+----+----+----+----
    |    |    |    |    |    |    |
----+----+----+----+----+----+----+----    Press I for
    |    |    |    |    |    |    |       Instructions
----+----+----+----+----+----+----+----  ----------------
 WP | WP | WP | WP | WP | WP | WP | WP
----+----+----+----+----+----+----+----  O:close      Z:5
 WR | WN | WB | WQ | WK | WB | WN | WR  N:desc (K4)  J:5

Your turn:                    White
```

Print out of low res graphics game start

The computer's strategy is determined by the options: Opening Style, Mid-game Zeal, Clock Timing and Playing Level. The Mid-game Zeal instructs the computer to play more aggressively (or passively) in the middle game. You select the level of aggressiveness from 0 to 9.

The game is as advertised. It runs extremely well (That means I couldn't lock it up or crash it). As a learning device for Chess it is excellent. For entertainment of established Chess players it will get as tough as you want, tougher than I want! The graphics are beautiful in the hi res mode. The low res mode is hard to decipher, especially if you are using algebraic notation. The board printouts for the high res are nice enough that I have one hanging in my lab, the low res printouts are in block and letter format (see illustrations). If you are interested in Chess you will like Tournament Chess.

Tournament Chess
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Magic Math Plus
Continued from page 118

contributed by school kids, include Primelite, Pascal's Triangle, Erastothenes, Fibonaci, Row Reduction and a graph program.

For those unfamiliar with Hexapawn, it's a board game you play against the program. The catch is, the program learns from its mistakes and gets better as it plays. This game alone is worth the price of a volume. It's a much-used example of artificial intelligence.

Palindromic Number Conjecture was next on my list of must-tries. A palindrome is a word, number or phrase that reads the same forwards and backwards. The words "did" and "rotator" are examples. This program demonstrates a way to produce these using a pattern. The conjecture in the title is that a palindrome will always be produced using the pattern. In this case, you take a number, add to it its reversal and see if it's palindromic. If not, add the sum of its reversal.

This is a very interesting exercise in mathematics. The program bombs, however, if you just hit <ENTER> instead of a number.

The Bubble Sort Demo is another interesting program. You simply type in a string of characters and they are sorted on the screen, demonstrating the way they "float" to the correct order. The program also shows you how slow the bubble sort is without really meaning to do so.

The bonus programs are of about the same quality as the others. Each demonstrates some mathematical function. They all work well, but some lack sophistication. Primelite, for instance, is supposed to demonstrate prime numbers using graphic blocks. I suppose you could say that it succeeds, but it is so slow that I gave up on it after several minutes of watching some very dull graphics on the screen. The author of the program recognized the lack of speed and tells you at the beginning of it to have patience because it speeds up. As I said, after several minutes, I lost my patience.

Recreational Mathemagical Software never makes any claims about the sophistication of this package. These are plain-Jane programs aimed at middle school and high school students, nothing more. The price is very reasonable for what you get.

After running through the package a few times, I couldn't help but feel that my experiences with math could have been a lot easier to handle if I had had a computer and some easy to understand programs like those to hold my hand through some of the more obscure areas of the subject.

With a little work on the error-checking of some of the programs and a return to the menu at the conclusion of each, this could be a winner. As it is, I'd give it a moderate recommendation.

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Inside the VIC-20
Continued from page 53

First, we need to save all the old vectors that we are going to replace. This means we'll need a permanent RAM table with the length of the new table we are going to install to hold the old vectors.

Here's the code:

```
;* SAVE THE OLD VECTOR TABLE *
;
        LDX #TABSIZ     ;LENGTH OF SAVE AREA = NEW TABLE
LOOP1   LDA IOPEN,X     ;START AT THE FIRST VECTOR TO BE
                        ;SAVED IN THE OLD TABLE.
        STA SAVETAB,X   ;STORE IT IN THE RAM SAVE AREA.
        DEX
        BPL LOOP1
;
```

This set up a new jump table in RAM for use by our program. (Actually, I've modified the above code somewhat. The initial versions of the printer driver used indirect jumps to call addresses saved by this code. In the latest versions, I am constructing an absolute jump table using absolute jumps in front of each address. This is needed because of an obscure bug in the 6502. Otherwise crashes can result when the program is randomly relocated and indirect jumps are used.)

With the old vectors safely stored, we can now insert our new I/O Indirect Routine vectors into the Work area:

```
;* INSTALL THE NEW VECTOR TABLE *
;
        LDX #TABSIZ     ;LENGTH OF NEW I/O VECTOR TABLE
LOOP2   LDA NTABLE,X    ;NTABLE = FIRST ADDR. OF NEW TABLE.
        STA IOPEN,X     ;STORE IT IN THE RAM WORK AREA AT
                        ;PROPER LOCATION.
        DEX
        BPL LOOP2
;
```

Now, with the new vectors installed into the copy of vectors at "WORK," we can tell "VECTOR" to install the new table for us. We don't even have to know what the lower RAM locations are. It is all handled automatically for us by VECTOR.

```
;
LDX     #<WORK          ;INSTALL THE NEW VECTOR TABLE
LDY     #>WORK          ;INTO THE KERNAL RAM.
CLC
JSR VECTOR
RTS                     ;INITIALIZATON DONE.
;
```

After we call VECTOR the second time, we are now wedged into the KERNAL. We can intercept any calls to ROM and redirect them to our own device driver routines or we can still jump to the ROM and if it's a device we don't want to replace. This gives us a lot of flexibility. In order for this work, we must do our own OPEN, CLOSE, CHRIN, and CHROUT, among others. Next time we'll look closer at some of the ROM replacement routines that handle the printer as a new device.

More Storage For Your Commodore

Last month we looked at some ways to perk up the standard 1541 disk drive. This month, we want to look at some of the alternatives to the 1541.

If you are a VIC/64 user with the problem of not enough disk space, until recently, the only options you had were to add more 1541s to your system or use an IEEE adapter and connect some of the older Commodore drives.

By the time this article is printed, there will be a couple of other options for mass storage devices on the market for your VIC/64: the 1571/72 drive and several Winchester hard drives. We'll take a look at these options and see what their advantages and limitations are.

Commodore Disk Formats

In order to help you under stand the bewildering array of drives that were once (and are now) available, I have constructed a table describing the most popular disk drives that Commodore has made over the years (see Table 1). This table is correct to the best of my knowledge, but I'm sure there are some omissions.

Disk drives produced over the years by Commodore can be grouped in three general catagories, corresponding to the disk format that the drives have used. These are referred to as "2040" format, "4040" format, and "8050/8250" format.

The 2020 was Commodore's first floppy disk unit. The 2020 had two drives that were Single Sided, Single Density (SSSD) units but, through trickery, stored more than most as Double Density (SSDD) drives. The 2020 is now considered obsolete by Commodore and most remaining 2020s have been converted to 4040s (a simple ROM upgrade).

The 4040 was the 2020 drive with some improvements in reliability and power. Relative file structures were first introduced with the 4040. The format is still SSSD, but is slightly incompatible with the 2020. You can read 2020 format disks in a 4040 type drive, but that's it. Although the 4040 is out of production, the disk format lives on in the 1541 and even the 1571 (although there are many 1541s that have some slight incompatibility problems

Continued on page 134

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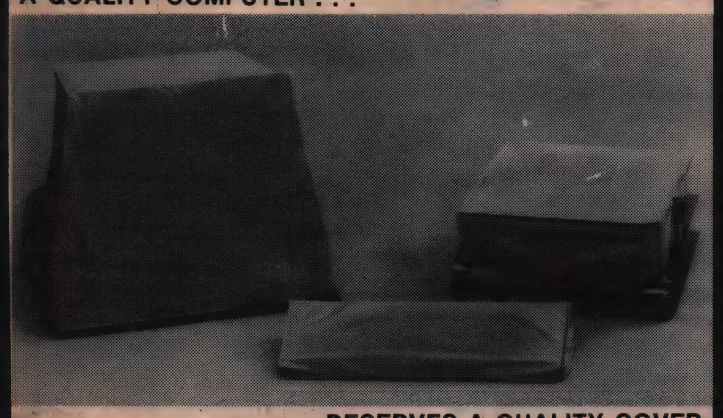

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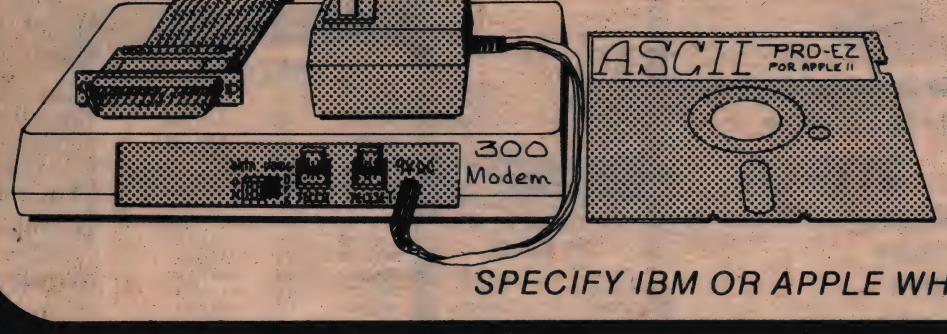

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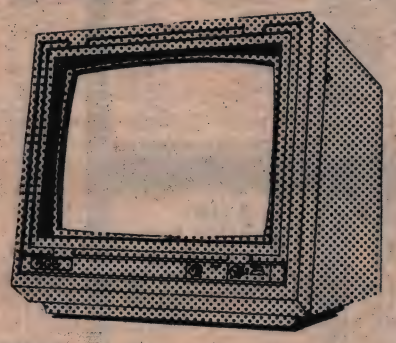

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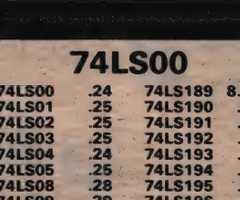

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74LS11	.35	74LS221	.89
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74LS13	.45	74LS241	.99
74LS14	.59	74LS242	.99
74LS15	.35	74LS243	.99
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74LS21	.29	74LS245	1.49
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74LS28	.35	74LS251	.59
74LS30	.25	74LS253	.59
74LS32	.29	74LS257	.59
74LS33	.55	74LS258	.59
74LS37	.35	74LS259	2.75
74LS38	.35	74LS260	.59
74LS40	.25	74LS261	2.25
74LS42	.49	74LS266	.55
74LS47	.75	74LS273	1.49
74LS48	.75	74LS275	3.35
74LS49	.75	74LS279	.49
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7406	.29	7492	.50	74178	1.15
7407	.29	7493	.35	74179	1.75
7408	.24	7494	.65	74180	.75
7409	.19	7495	.55	74181	2.25
7410	.19	7496	.70	74182	.75
7411	.25	7497	2.75	74184	2.00
7412	.30	74100	1.75	74185	2.00
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7416	.25	74109	.45	74191	1.15
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7420	.19	74111	.55	74193	.79
7421	.35	74116	1.55	74194	.85
7422	.35	74120	1.20	74195	.85
7423	.29	74121	.29	74196	.79
7425	.29	74122	.45	74197	.75
7426	.29	74123	.49	74198	1.35
7427	.29	74125	.45	74199	1.35
7428	.45	74126	.45	74221	1.35
7430	.19	74128	.55	74246	1.35
7432	.29	74132	.45	74247	1.25
7433	.45	74136	.50	74248	1.85
7437	.29	74141	.65	74249	1.95
7438	.29	74142	2.95	74251	.75
7439	.79	74143	4.95	74259	2.25
7440	.19	74144	2.95	74265	1.35
7442	.49	74145	.60	74273	1.95
7443	.65	74147	1.75	74276	1.25
7444	.69	74148	1.20	74278	3.11
7445	.69	74150	1.35	74279	.75
7446	.69	74151	.55	74283	2.00
7447	.69	74152	.65	74284	3.75
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7450	.19	74154	1.25	74290	.95
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7476	.35	74165	.85	74393	1.35
7480	.59	74166	1.00	74425	3.15
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4013	.38	4560	4.25
4014	.79	4569	3.49
4015	.39	4581	1.95
4016	.39	4582	1.95
4017	.69	4584	.75
4018	.79	4585	.75
4019	.39	45151	12.95
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4021	.79	4724	1.50
4022	.79	74C00	.35
4023	.29	74C02	.35
4024	.65	74C04	.35
4025	.29	74C08	.35
4026	1.65	74C10	.35
4027	.45	74C14	.59
4028	.69	74C20	.35
4029	.79	74C30	.35
4030	.39	74C32	.39
4034	1.95	74C42	1.29
4035	.85	74C48	1.99
4040	.75	74C73	.65
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4042	.69	74C76	.80
4043	.85	74C83	1.95
4044	.79	74C85	1.95
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4047	.95	74C89	4.50
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4051	.79	74C150	5.75
4052	1.99	74C151	2.25
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4066	.39	74C160	1.19
4068	.39	74C161	1.19
4069	.29	74C162	1.19
4070	.35	74C163	1.19
4071	.29	74C164	1.39
4072	.29	74C165	2.00
4073	.29	74C173	.79
4075	.29	74C174	1.19
4076	.79	74C175	1.19
4077	.59	74C192	1.49
4078	.29	74C193	1.49
4081	.29	74C195	1.39
4082	.29	74C200	5.75
4085	.95	74C221	1.75
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4093	.49	74C373	2.45
4094	2.99	74C374	2.45
4098	2.49	74C901	.39
4099	1.95	74C902	.85
14409	12.95	74C903	.85
14410	12.95	74C905	10.95
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74HCT00

74HCT: Direct, drop-in replacements for LS TTL and can be intermixed with 74LS in the same circuit.

74HCT00	.69	74HCT175	1.09
74HCT02	.69	74HCT193	1.39
74HCT04	.69	74HCT194	1.19
74HCT08	.69	74HCT195	1.29
74HCT10	.69	74HCT238	1.49
74HCT11	.69	74HCT240	2.19
74HCT14	.89	74HCT241	2.19
74HCT20	.69	74HCT242	2.19
74HCT27	.69	74HCT243	2.19
74HCT30	.69	74HCT244	2.19
74HCT32	.79	74HCT245	2.19
74HCT51	.69	74HCT251	1.09
74HCT74	.85	74HCT257	.99
74HCT75	.95	74HCT259	1.59
74HCT85	1.49	74HCT273	2.09
74HCT86	.79	74HCT299	5.25
74HCT93	1.29	74HCT367	1.09
74HCT125	1.29	74HCT373	2.49
74HCT132	1.29	74HCT374	2.49
74HCT138	1.15	74HCT393	1.59
74HCT139	1.15	74HCT4017	2.19
74HCT151	1.05	74HCT4020	1.59
74HCT153	1.05	74HCT4024	1.79
74HCT154	2.99	74HCT4040	1.59
74HCT157	.99	74HCT4049	.99
74HCT161	1.29	74HCT4050	.99
74HCT164	1.39	74HCT4060	1.49
74HCT166	3.05	74HCT4511	2.69
74HCT174	1.09	74HCT4538	2.59

SPECTRONICS CORPORATION

EPROM ERASERS

	Timer	Capacity Chip	Intensity (uW/Cm²)	
PE-14		9	8,000	$83.00
PE-14T	x	9	8,000	$119.00
PE-24T	x	12	9,600	$175.00
PL-265T	x	30	9,600	$255.00
PR-125T	x	25	17,000	$349.00
PR-320T	x	42	17,000	$595.00

VOLTAGE REGULATORS

TO-220 CASE PACKAGE

7805T	.75	7905T	.85
7808T	.75	7908T	.85
7812T	.75	7912T	.85
7815T	.75	7915T	.85
7824T	.75	7924T	.85

TO-3 CASE PACKAGE

7805K	1.39	7905K	1.49
7812K	1.39	7912K	1.49
7815K	1.39	7915K	1.49
7824K	1.39	7924K	1.49

TO-92 CASE PACKAGE

78L05	.69	79L05	.79
78L12	.69	79L12	.79
78L15	.69	79L15	.79

OTHER VOLTAGE REGS

78M05C	5volt	½amp	TO-220	.35
LM323K	5volt	3amp	TO-3	4.95
LM338K	Adj.	5amp	TO-3	3.95
78H05K	5volt	5amp	TO-3	9.95
78H12K	12volt	5amp	TO-3	9.95
78P05K	5volt	10amp	TO-3	14.95
UA78S40	FAIRCHILD		DIP	1.95

LINEAR

LM301	.34	NE570	3.95
LM301H	.79	NE571	2.95
LM307	.45	NE590	2.50
LM308	.69	NE592	.98
LM308H	1.15	LM709	.59
LM309H	1.95	LM710	.75
LM309K	1.25	LM711	.79
LM310	1.75	LM723	.49
LM311	.64	LM723H	.55
LM311H	.89	LM733	.98
LM312H	1.75	LM741	.35
LM317K	3.95	LM741N-14	.35
LM317T	1.19	LM741H	.40
LM318	1.49	LM747	.69
LM318H	1.59	LM748	.59
LM319H	1.90	LM1014	1.19
LM319	1.25	LM1303	1.95
LM320	see7900	LM1310	1.49
LM322	1.65	MC1330	1.69
LM323K	4.95	MC1349	1.89
LM324	.59	MC1350	1.19
LM329	.65	MC1358	1.69
LM331	3.95	MC1372	6.95
LM334	1.19	LM1414	1.59
LM335	1.40	LM1458	.59
LM336	1.75	LM1488	.69
LM337T	1.95	LM1489	.69
LM337K	3.95	LM1496	.85
LM338K	3.95	LM1558H	3.10
LM339	.99	LM1800	2.37
LM340	see7800	LM1812	8.25
LM348	.99	LM1830	3.50
LM350K	4.95	LM1871	5.49
LM350T	4.60	LM1872	5.49
LM358	.69	LM1877	3.52
LM359	1.79	LM1889	1.95
LM376	3.75	LM1896	1.75
LM377	1.95	ULN2003	1.29
LM378	2.50	XR2206	3.75
LM379	4.50	LM2877	2.05
LM380	.89	LM2878	2.25
LM380N-8	1.10	LM2900	.85
LM381	1.60	LM2901	1.00
LM382	1.60	MPQ2907	1.95
LM383	1.95	LM2917	2.95
LM384	1.95	MC3487	2.95
LM386	.89	LM3900	.59
LM387	1.40	LM3905	1.25
LM389	1.35	LM3909	.98
LM390	1.95	LM3911	2.25
LM392	.69	LM3914	3.95
LM393	1.29	LM3915	3.95
LM394H	4.60	LM3916	3.95
LM399H	5.00	MC4024	3.95
NE531	2.95	MC4044	4.50
NE555	.34	RC4136	1.25
NE556	.65	RC4151	3.95
NE558	1.50	LM4250	1.75
NE564	2.95	LM4500	3.25
LM565	.99	RC4558	.69
LM566	1.49	LM13600	1.49
LM567	.89	LM13700	1.45

H=TO-5 CAN, K=TO-3, T=TO-220

RCA

CA3023	2.75	CA3083	1.55
CA3039	1.29	CA3086	.80
CA3046	1.25	CA3089	2.99
CA3059	2.90	CA3096	3.49
CA3060	2.90	CA3130	1.30
CA3065	1.75	CA3140	1.15
CA3080	1.10	CA3146	1.85
CA3081	1.65	CA3160	1.19
CA3082	1.65	CA3183	.99

TI

TL494	4.20	75365	1.95
TL496	1.65	75450	.59
TL497	3.25	75451	.39
75107	1.49	75452	.39
75108	1.49	75453	.39
75110	1.95	75454	.39
75150	1.95	75477	1.29
75154	1.95	75491	.79
75160	4.95	75492	.79
75188	1.25	75493	.89
75189	1.25	75494	.89

BI FET

TL066	.99	LF347	2.19
TL071	.79	LF351	.60
TL072	1.19	LF353	1.00
TL074	2.19	LF355	1.10
TL081	.79	LF356	1.10
TL082	1.19	LF357	1.40
TL083	1.19	LF411	1.29
TL084	2.19	LF412	1.99

TRANSISTORS

2N918	.50	2N3772	1.85
MPS918	.25	2N3903	.25
2N2102	.75	2N3904	.10
2N2218	.50	2N3906	.10
2N2218A	.50	2N4122	.25
2N2219	.50	2N4123	.25
2N2219A	.50	2N4249	.25
2N2222	.25	2N4304	.75
PN2222	.10	2N4401	.25
MPS2369	.25	2N4402	.25
2N2484	.25	2N4403	.25
2N2905	.50	2N4857	1.00
2N2907	.25	PN4916	.25
PN2907	.13	2N5086	.25
2N3055	.79	PN5129	.25
3055T	.69	PN5139	.25
2N3393	.30	2N5209	.25
2N3414	.25	2N6028	.35
2N3563	.40	2N6043	1.75
2N3565	.40	2N6045	1.75
PN3565	.25	MPS-A05	.25
MPS3638	.25	MPS-A06	.25
MPS3640	.25	MPS-A13	.40
PN3643	.25	MPS-A55	.25
PN3644	.25	MPU-131	.99
MPS3704	.15	TIP29	.65
MPS3706	.15	TIP31	.75
		TIP32	.79

IC SOCKETS

	1-99	100
8 PIN ST	.13	.11
14 PIN ST	.15	.12
16 PIN ST	.17	.13
18 PIN ST	.20	.18
20 PIN ST	.29	.27
22 PIN ST	.30	.27
24 PIN ST	.30	.27
28 PIN ST	.40	.32
40 PIN ST	.49	.39
64 PIN ST	4.25	CALL

ST=SOLDERTAIL

8 PIN WW	.59	.49
14 PIN WW	.69	.52
16 PIN WW	.69	.58
18 PIN WW	.99	.90
20 PIN WW	1.09	.98
22 PIN WW	1.39	1.28
24 PIN WW	1.49	1.35
28 PIN WW	1.69	1.49
40 PIN WW	1.99	1.80

WW=WIREWRAP

INTERFACE

8T26	1.59
8T28	1.98
8T95	.89
8T96	.89
8T97	.89
8T98	.89
DM8131	2.95
DP8304	2.29
DS8833	2.25
DS8835	1.99
DS8836	.99
DS8837	1.65
DS8838	1.30

INTERSIL

ICL7106	9.95
ICL7107	12.95
ICL7660	2.95
ICL8038	3.95
ICM7207A	5.59
ICM7208	15.95

DATA ACQ

ADC0800	15.55
ADC0804	3.49
ADC0809	4.49
ADC0816	14.95
ADC0817	9.95
ADC0831	8.95
DAC0800	4.49
DAC0806	1.95
DAC0808	2.95
DAC1020	8.25
DAC1021	7.95
DAC1022	5.95
MC1408L6	1.95
MC1408L8	2.95

EXAR

XR2206	3.75
XR2207	3.75
XR2208	3.75
XR2211	5.25
XR2240	3.25

9000

9304	.95
9316	1.00
9328	1.49
9334	2.50
9368	3.95
9401	9.95
9601	.75
9602	1.50
9637	2.95
96S02	1.95

SOUND CHIPS

76477	3.95
76488	5.95
76489	8.95
SSI-263	39.95
AY3-8910	12.95
AY3-8912	12.95
MC3340	1.49
SP1000	39.00

OPTO-ISOLATORS

4N26	1.00	MCA-7	4.25
4N27	1.10	MCA-255	1.75
4N28	.69	IL-1	1.25
4N33	1.75	ILA-30	1.25
4N35	1.25	ILQ-74	2.75
4N37	1.25	H11C5	1.25
MCT-2	1.00	TIL-111	1.00
MCT-6	1.50	TIL-113	1.75

I have had nothing but good experiences with JDR and look foward to more of the same. It's not often a company is willing to help customers to the extent JDR has.

— Stephen L. Vajo

VISA MasterCard

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DB25S RS232 FEMALE SOLDER CUP 2.25

DB25P RS232 MALE SOLDER CUP 1.90

BARGAIN HUNTERS CORNER

DYNAMIC RAMS

4164 200ns $.99 ea.
100 PIECE MINIMUM

41256 150ns $5.99 ea.
27 PIECE MINIMUM

SPECIALS END 7/31/85

HARD TO FIND "SNAPABLE" HEADERS

Can easily be snapped apart to make any size header, all with .1" centers

1x40	STRAIGHT LEAD	.99
1x40	RIGHT ANGLE	1.49
2x40	STRAIGHT LEAD	2.49
2x40	RIGHT ANGLE	2.99

SHORTING BLOCKS

SPACED AT .1" CENTERS
IDEAL FOR DISK DRIVES OR ANY .1" HEADER
5/1.00

DIP SWITCHES

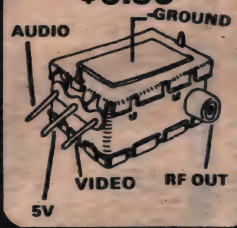
4 POSITION	.85
5 POSITION	.90
6 POSITION	.90
7 POSITION	.95
8 POSITION	.95
10 POSITION	1.29

RF MODULATOR (ASTEC UM1082)

QUANTITIES LIMITED

- PRESET TO CHANNEL 3
- USE TO BUILD TV-COMPOTER INTERFACE
- +5 VOLT OPERATION

$6.95



EDGECARD CONNECTORS

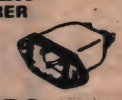
S-100 ST	S-100	3.95
S-100 WW	S-100	4.95
72 PIN ST		6.95
72 PIN WW		7.95
62 PIN ST	IBM PC	4.95
50 PIN ST	APPLE	4.95
44 PIN ST		2.95
44 PIN WW		4.95

36 PIN CENTRONICS

IDCEN36	RIBBON CABLE MALE	8.95
IDCEN36/F	RIBBON CABLE FEMALE	8.95
CEN36	SOLDER CUP MALE	7.95

EMI FILTER

- MAJOR MANUFACTURER
- LOW COST
- FITS LC-HP BELOW



$4.95

LINE CORDS

LC-2	2 CONDUCTOR	6 ft	.39
LC-3	3 CONDUCTOR	6 ft	.99
LC-HP	3 CONDUCTOR WITH STANDARD FEMALE SOCKET	6 ft	1.49
LC-CIR	CIGARETTE LIGHTER PLUG WITH 6 FOOT CORD		2.95

MUFFIN FANS

4.68" SQUARE	14.95
3" SQUARE	14.95

RESISTORS

¼ WATT 5% CARBON FILM
ALL STANDARD VALUES
FROM 1 OHM TO 10 MEG OHM

50 PIECES SAME VALUE	.025
100 PIECES SAME VALUE	.02
1000 PIECES SAME VALUE	.015

BYPASS CAPS

.01 µf DISC	100/$6.00
.01 µf MONOLITHIC	100/$12.00
.1 µf DISC	100/$8.00
.1 µf MONOLITHIC	100/$15.00

DIODES

1N751	5.1 VOLT ZENER	.25
1N759	12.0 VOLT ZENER	.25
1N4148	(1N914)SWITCHING	25/1.00
1N4001	50PIV 1A	12/1.00
1N4004	400PIV RECTIFIER	10/1.00
1N5402	200PIV 3A	.25
KBP02	200PIV 1.5A BRIDGE	.45
KBP04	400PIV 1.5A BRIDGE	.55
MDA801	50PIV 12A BRIDGE	1.39
MDA980-1	50PIV 12A BRIDGE	1.95
MDA980-2	100PIV 12A BRIDGE	2.25
VM48	DIP-BRIDGE	.35

HEAT SINKS

TO-220	SCREW ON	.35
TO-220	CLIP ON	.35
TO-3	SCREW ON	.95
TO-220	INSULATOR	10/1.00
TO-3	INSULATOR	10/1.00

SWITCHES

SPDT	MINI-TOGGLE ON-ON	1.25
DPDT	MINI-TOGGLE ON-ON	1.50
DPDT	MINI-TOGGLE ON-OFF-ON	1.75
SPST	MINI-PUSHBUTTON N.O.	.39
SPST	MINI-PUSHBUTTON N.C.	.39
BCD OUT 10 POSITION 6 PIN DIP		1.95

CAPACITORS

TANTALUM

1.0µf	15V	.40	.47µf	35V	.50
6.8	15V	.70	1.0	35V	.45
10	15V	.80	2.2	35V	.65
22	15V	1.35	4.7	35V	.85
.22	35V	.40	10	35V	1.00

DISC

10pf	50V	.05	560	50V	.05
22	50V	.05	680	50V	.05
25	50V	.05	820	50V	.05
27	50V	.05	.001µf	50V	.05
33	50V	.05	.0015	50V	.05
47	50V	.05	.0022	50V	.05
56	50V	.05	.005	50V	.05
68	50V	.05	.01	50V	.07
82	50V	.05	.02	50V	.07
100	50V	.05	.05	50V	.07
220	50V	.05	.1	12V	.10

MONOLITHIC

.01µf	50V	.14	.1µf	50V	.18
.047µf	50V	.15	.47µf	50V	.25

ELECTROLYTIC

RADIAL			AXIAL		
1µf	25V	.14	1µf	50V	.14
2.2	35V	.15	4.7	16V	.14
4.7	50V	.15	10	16V	.14
10	50V	.15	10	50V	.16
47	35V	.18	22	16V	.14
100	16V	.18	47	50V	.20
220	35V	.20	100	15V	.20
470	25V	.30	100	35V	.25
2200	16V	.60	220	25V	.30
			330	16V	.40
COMPUTER GRADE			500	16V	.42
			1000	16V	.60
			2200	16V	.70
44,000µf 30V 3.95			6000	16V	.85

LED DISPLAYS

HP5082-7760	CC	.43"	1.29
MAN-72	CA	.3"	.99
MAN-74	CC	.3"	.99
FND-357(359)	CC	.375"	1.25
FND-500(503)	CC	.5"	1.49
FND-507(510)	CA	.5"	1.49
TIL-311 4x7 HEX W/LOGIC		.270"	9.95

DIFFUSED LEDS

		1-99	100-up
JUMBO RED	T1¾	.10	.09
JUMBO GREEN	T1¾	.18	.15
JUMBO YELLOW	T1¾	.18	.15
MOUNTING HDW	T1¾	.10	.09
MINI RED	T1	.10	.09
MINI GREEN	T1	.18	.15
MINI YELLOW	T1	.18	.15
RECT RED	2x5mm	.25	.22
RECT GREEN	2x5mm	.30	.27
RECT YELLOW	2x5mm	.30	.27

DIP CONNECTORS

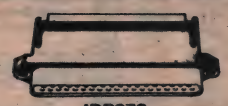
DESCRIPTION	ORDER BY	CONTACTS								
		8	14	16	18	20	22	24	28	40
HIGH RELIABILITY TOOLED ST IC SOCKETS	AUGATxxST	.99	.99	.99	1.69	1.89	1.89	1.99	2.49	2.99
HIGH RELIABILITY TOOLED WW IC SOCKETS	AUGATxxWW	1.30	1.80	2.10	2.40	2.50	2.90	3.15	3.70	5.40
COMPONENT CARRIES (DIP HEADERS)	ICCxx	.49	.59	.69	.99	.99	.99	.99	1.09	1.49
RIBBON CABLE DIP PLUGS (IDC)	IDPxx	---	.95	.95	---	---	---	1.75	---	2.95

FOR ORDERING INSTRUCTIONS SEE IDC CONNECTORS BELOW

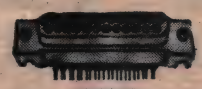
D-SUBMINIATURE

DESCRIPTION		ORDER BY	CONTACTS				
			9	15	25	37	50
SOLDER CUP	MALE	DBxxP	1.19	1.59	1.90	2.85	4.25
	FEMALE	DBxxS	1.50	1.85	2.25	3.90	5.25
RIGHT ANGLE PC SOLDER	MALE	DBxxPR	1.65	2.20	3.00	4.83	---
	FEMALE	DBxxSR	2.18	3.03	3.00	6.19	---
WIRE WRAP	MALE	DBxxPWW	1.69	2.56	3.89	5.60	---
	FEMALE	DBxxSWW	2.76	4.27	6.84	9.95	---
IDC RIBBON CABLE	MALE	IDBxxP	2.95	3.90	4.75	6.95	---
	FEMALE	IDBxxS	3.25	4.29	5.25	7.95	---
HOODS	BLACK	HOOD-B	---	---	.99	---	---
	GREY	HOODxx	.89	.99	.99	1.09	1.19

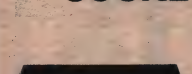
MOUNTING HARDWARE-$1.00
FOR ORDERING INSTRUCTIONS SEE IDC CONNECTORS BELOW

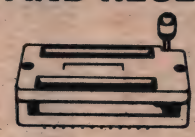

IDB37S

DB37S


DB25SR

TEXTOOL ZERO INSERTION FORCE SOCKETS AND RECEPTACLES


SCREWDRIVER CLAMP ECONO ZIF


LEVER CLAMP ZIF SOCKET

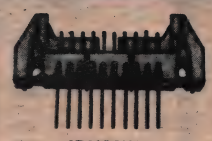
WW RECEPTACLES ZIF RECEPTACLE

TYPE	CONTACTS				
	14	16	24	28	40
ECONO ZIF	---	4.95	6.75	7.75	9.95
ZIF SOCKET	4.95	4.95	5.95	6.95	9.95
ZIF RECEPTACLE	8.25	8.75	9.75	10.50	12.75

IDC CONNECTORS

DESCRIPTION	ORDER BY	CONTACTS					
		10	20	26	34	40	50
SOLDER HEADER	IDHxxS	.82	1.29	1.68	2.20	2.58	3.24
RIGHT ANGLE SOLDER HEADER	IDHxxSR	.85	1.35	1.76	2.31	2.72	3.39
WW HEADER	IDHxxW	1.86	2.98	3.84	4.50	5.28	6.63
RIGHT ANGLE WW HEADER	IDHxxWR	2.05	3.28	4.22	4.45	4.80	7.30
RIBBON HEADER SOCKET	IDSxx	.79	.99	1.39	1.59	1.99	2.25
RIBBON HEADER	IDMxx	---	5.50	6.25	7.00	7.50	8.50
RIBBON EDGE CARD	IDExx	1.75	2.25	2.65	2.75	3.80	3.95

ORDERING INSTUCTIONS: INSERT THE NUMBER OF CONTACTS IN THE POSITION MARKED "xx" OF THE "ORDER BY" PART NUMBER LISTED. EXAMPLE: A 10 PIN RIGHT ANGLE HOLDER STYLE WOULD BE IDH10SR


IDH20W

IDE50

RIBBON CABLE

CONTACTS	SINGLE COLOR		COLOR CODED	
	1'	10'	1'	10'
10	.18	1.60	.83	7.30
16	.28	2.50	1.00	8.80
20	.36	3.20	1.25	11.00
25	.45	4.00	1.32	11.60
26	.46	4.10	1.32	11.60
34	.61	5.40	1.65	14.50
40	.72	6.40	1.92	16.80
50	.89	7.50	2.50	22.00

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IBM PC PROTOTYPE CARD WITH DECODING CIRCUITRY $29.95

WIRE WRAP PROTOTYPE CARDS

FR-4 EPOXY GLASS LAMINATE WITH GOLD-PLATED EDGE-CARD FINGERS

IBM-PR2

IBM

BOTH CARDS HAVE SILK SCREENED LEGENDS AND INCLUDES MOUNTING BRACKET

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P100-2	HORIZONTAL BUS	$21.80
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P100-4	SINGLE FOIL PADS PER HOLE	$22.75

APPLE

P500-1	BARE - NO FOIL PADS	$15.15
P500-3	HORIZONTAL BUS	$22.75
P500-4	SINGLE FOIL PADS PER HOLE	$21.80
7060-45	FOR APPLE IIe AUX SLOT	$30.00

GENERAL PURPOSE

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P441-3	VERTICAL BUS 4.5" x 6.0"	$13.95
P441-4	SINGLE FOIL PADS 4.5" x 6.0"	$14.20
P442-1	BARE - NO FOIL PADS 4.5" x 9.0"	$10.40
P442-3	VERTICAL BUS 4.5" x 9.0"	$14.20
P442-4	SINGLE FOIL PADS 4.5" x 9.0"	$13.50

36/72 PIN EDGE-CARD (.1" SPACING)

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P721-3	VERTICAL BUS 4.5" x 6.0"	$13.25
P721-4	SINGLE FOIL PADS 4.5" x 6.0"	$14.20
P722-1	BARE - NO FOIL PADS 4.5" x 9.0"	$10.40
P722-3	VERTICAL BUS 4.5" x 9.0"	$14.20
P722-4	SINGLE FOIL PADS 4.5" x 9.0"	$15.15

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P45x65	4.5" x 6.5"	$4.70
P45x85	4.5" x 8.5"	$6.20
P45x170	4.5" x 17.0"	$11.35
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APPLE	$45.00
MULTIBUS	$86.00

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MPI

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TEAC

FD-55B	½ HEIGHT DS/DD	$119.95
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TEAC FD-55B

SHUGART

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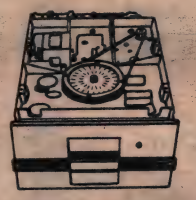
FD200-8	BY SIEMENS, SHUGART 851 EQUIV. DS/DD	$180.00



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- Color matches Apple

CABINET #2 $79.00
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- 130 WATTS
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- ONE YEAR WARRANTY

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- USE TO POWER APPLE TYPE SYSTEMS
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EX-1

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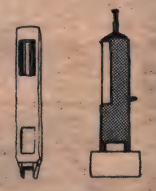
MOS-40	for 40 pin IC's	$12.43

MOS series insertion tools have metal constuction and include grounding lug for CMOS applications.



INS-1416 INS-2428

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- ANTI-OVERWRAP DEVICE $41.55

BW-630

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- WRAPS, STRIPS, AND UNWRAPS
- WSU-30M WRAPS AN EXTRA TURN OF INSULATION

WSU-30 $8.84/WSU-30M $10.14

WSU-30/30M

WIRE DISPENSER

- WITH 50' ROLL OF WIRE
- BUILT IN PLUNGER CUTS WIRE
- BUILT IN STRIPPER STRIPES 1"
- REFILLABLE

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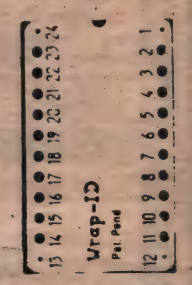
SOCKET-WRAP I.D.™

- SLIPS OVER WIRE WRAP PINS
- IDENTIFIES PIN NUMBERS ON WRAP SIDE OF BOARD
- CAN WRITE ON PLASTIC; SUCH AS IC #

PINS	PART#	PCK. OF	PRICE
8	IDWRAP 08	10	1.95
14	IDWRAP 14	10	1.95
16	IDWRAP 16	10	1.95
18	IDWRAP 18	5	1.95
20	IDWRAP 20	5	1.95
22	IDWRAP 22	5	1.95
24	IDWRAP 24	5	1.95
28	IDWRAP 28	5	1.95
40	IDWRAP 40	5	1.95

PLEASE ORDER BY NUMBER OF PACKAGES (PCK. OF)



WIRE WRAP WIRE

PRECUT AND STRIPPED

Note: 1 inch of insulation is stripped on each end. A 3.5" wire has only 1.5" of insulation.

LENGTH (INCHES)	QUANTITY 100	500	1000
2.5	1.60	4.70	8.20
3	1.60	4.70	8.20
3.5	1.65	5.00	8.90
4	1.75	5.40	9.60
4.5	1.80	5.75	10.30
5	1.85	6.10	11.00
5.5	1.90	6.50	11.75
6	2.00	6.85	12.50
6.5	2.30	7.80	14.30
7	2.40	8.20	15.05
7.5	2.50	8.55	15.85
8	2.60	8.95	16.60
8.5	2.65	9.30	17.40
9	2.70	9.80	18.15
9.5	2.80	10.00	18.95
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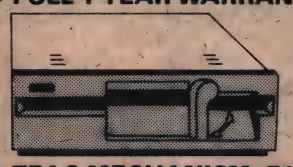
- FULL 1 YEAR WARRANTY



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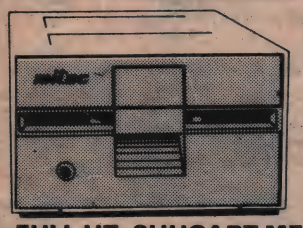
- 100% APPLE COMPATIBLE
- FULL 1 YEAR WARRANTY



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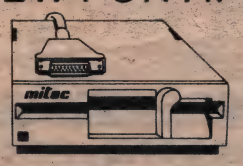
APPLE IIc ADAPTOR CABLE	$19.95

NEW FOR APPLE IIc



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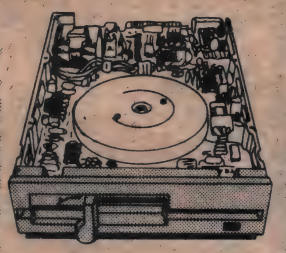

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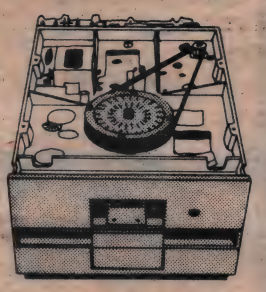

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$8.95 IF PURCHASED WITH 50 DISKETTES OR MORE

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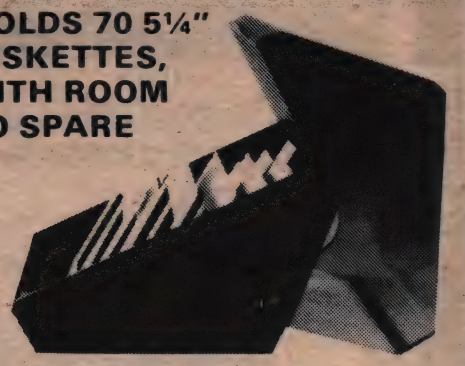
HOLDS 70 5¼" DISKETTES, WITH ROOM TO SPARE



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5¼" SOFT SECTOR DS/DD WITH HUB RINGS

BULK PACKAGED IN FACTORY SEALED BAGS OF 50. INCLUDES DISKETTE SLEEVES AND WRITE PROTECT TABS. IDEAL FOR SCHOOLS, CLUBS, AND USERS GROUPS. THIS IS A SPECIAL PURCHASE, SO QUANTITIES ARE LIMITED. THERE IS A 5 YEAR WARRANTY.

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SS/DD	SOFT SECTOR	$29.95
SS/DD	10 SECTOR HARD	$29.95
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- +5V @ 15A, +12 @ 4.2A -5 @ .5A, -12 @ .5A
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APPLE IS A TRADEMARK OF APPLE COMPUTER CO.

I*U*CO is the best thing to happen to personal computing since the personal computer.

I*U*CO is an idea whose time has come.

I*U*CO is the International Union of Computer Owners, an organization designed to protect the interests of computer owners and users against those who would take their money...and then deliver less than they promised.

Here's an overview of some of the vital services I*U*CO provides:

1. Access to the lowest priced, reputable vendor for nearly every computer related need; and,
2. Protection from the rip-off artists, vaporware specialists, false advertisers and other creepy, crawly creatures who have been attracted to the computer industry by the scent of your money; and,
3. Constantly updated information on software and hardware releases, bug reports, fixes and other data individually tailored to your needs through I*U*CO's exclusive Computer Registry; and,
4. Finally, a chance to get even with those characters out there who promise a lot, take your money and then deliver less than they promised.

I*U*CO: a lynch mob with a purpose.

Every computer owner has been ripped off at least once.

Or maybe a dozen times might be a more appropriate number.

In any event, we've all been victimized by the computer industry.

And it wasn't accidental: today's computer industry is filled with hypesters, rip-off artists, vaporware specialists and others whose sole function in life is to part you from your money...while delivering less than you bargained for.

The rip-off might have been a computer that wasn't quite as "compatible" as claimed. Or a computer that didn't quite get delivered at the same time as the "hundreds" of new programs that would support it.

Or it might have been a software package that didn't quite live up to its advertising hype. Possibly, you've been had by a software manufacturer who continuously upgrades their software...charging you a pretty penny for an updated version that simply gets rid of the bugs that shouldn't have been there in the first place.

In a few cases, it might even have been a vendor who took your money...and never quite got around to delivering what you paid for.

In any event, owning a computer has been an open invitation to getting ripped-off in one way or another.

Until now.

I*U*CO means protection.

I*U*CO subscribes to some very ancient wisdom: in numbers, there is strength.

Labor unions learned it a long time ago.

An individual worker had no bargaining power. All the workers in a factory, however, have a lot of muscle.

Automobile owners learned it early on. The American Automobile Association was originally organized to bring motorists together in order to lobby for new roads and highways.

Even the computer industry has learned it: computer manufacturers, software publishers and others in the industry have now banded together in order to get legislative approval for their meaningless "disclaimers" and to restrict your right to copy the software you've purchased.

I*U*CO is designed to be what every collective organization is: a means to protect the special interests of its members.

And, in this case, the members are the victims...the people who own and use personal computers.

The people who, until now, have been powerless.

First of all, I*U*CO means low prices.

The first benefit an I*U*CO member gets is the opportunity to save money.

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I*U*CO maintains a database of every mail-order advertisement that appears in the major computer magazines.

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I*U*CO protects you.

Of course, buying mail order can get you more than low prices.

It can also get you a lot of problems in delivery.

So, along with the low price quotation, you also get I*U*CO member evaluations and reports about the vendor...and, to make sure that you'll be happy with the product, a bibliography of reviews, articles and letters to the editor about the product or service you want to buy!

In short, as an I*U*CO member, you not only find the lowest price...but you might also find out that you don't really want to spend the money in the first place!

These are the first steps in I*U*CO's program:

1. Getting you the lowest possible prices.
2. Giving you an assessment of the potential vendor.
3. Providing information on the actual use value of the product. *(An awful lot of products sound better in their advertising than they are in reality. That's why so few companies offer a money-back guaranty.)*

Continuing protection from I*U*CO: the Computer Registry.

As an I*U*CO member, you can become part of our exclusive Computer Registry.

You simply register the appropriate information about all the hardware, software and peripherals you own with I*U*CO.

Then, as updates are announced, problems are discovered, fixes released and so on, you automatically get this information.

No more finding out a year after the fact that the current version of your program is 3.14...not the Version 1.7 program you've been using. Likewise, you might find out that the mysterious system error messages you've been getting aren't just your problem, but rather wide spread.

(As a personal note, this I*U*CO service is invaluable.

In the early days of personal computers, hardware, software and peripheral manufacturers used to be pretty good about sharing information.

Today, they're not.

In the last few weeks, I personally have learned: a) my MacIntosh 512K Upgrade is defective and won't work with MacPaint under certain circumstances; b) the ROMS in my Anadex printer have been upgraded; c) the ROMS in my IOMEGA Bernoulli box have been upgraded; d) MicroPro eliminated the copy protection on my version of Wordstar 2000 Plus; e) MicroPro had a bug in InfoStar for more than 18 months...and didn't tell anyone.

I*U*CO membership would have avoided these unpleasant surprises.)

With I*U*CO, you get the information you need on an individualized basis...and you get it fast.

You don't have to tear your hair out wondering about a problem. You might even find out about the problem before you encounter it!

I*U*CO: the iron fist.

The best part of I*U*CO has been saved for last.

Yes, I*U*CO will get you lower prices and will give you solid information about the integrity and usefulness of products and vendors.

But, more importantly, your membership in I*U*CO gives you the power of belonging to a community...a community of computer owners and users who need to protect their rights.

For instance, a group of software publishers recently managed to get the Louisiana legislature to pass a law "legalizing" the non-warranties they provide with their software. (You know, "this software is sold without any representations that it will work".)

I*U*CO will fight that kind of nonsense by lobbying against it.

Likewise, when a company...even a major company...announces vaporware, I*U*CO will use the same tools to fight back...to prevent publishers and dealers from getting us all aglow about a new machine or a new piece of software that won't be delivered for months. (For instance, how many people would have bought the MacIntosh a year ago had they known that the "hundreds" of programs to be "shortly available" simply didn't exist?)

Finally, when the situation demands it, I*U*CO will be ready to sue. For example, what do you do in a situation where you run out and buy Wordstar 2000 Plus...only to find out later that its files are not compatible with the original Wordstar? (If you read the advertising, it doesn't say a word about it. You find out after you've laid your dollars on the table!)

There's a lot more to the I*U*CO story.

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Hardware of Sanyo
Continued from page 56

with the right answer.

When You Have A Moderate Stepper Problem

If the problem of stepper accuracy is pretty bad, the only remedy is a replacement with a stepper known to be accurate. I see, now you want to check the accuracy of the stepper and, consequently, the accuracy of track positions. Unfortunately, you need a scope which is a very rare item for a hacker to have on his shelves but almost any scope you can get will do. Place the probe at the head signal line. The signal amplitude can be somewhere from 0.05V to 3.5V depending on which point you came across, choosing from the several test pins near the head plug or head signal amplifier. You must see analog signal, not the digital signal. Put in the diskette, run the drive, and carefully lower the head onto the disk. If you see the head signal which becomes stronger as the head approaches the disk surface and if you see the largest signal amplitude as the head touches the disk, you have the analog signal. If you see a sudden appearance of signal as the head touches, you may be looking at the raw read signal which is the digital signal obtained from the output of the analog amplifier. In newer drives the analog amplifier and signal level converter from analog to digital are packaged as one hybrid circuit. So, poke around the pins to get at the signal, but take caution not to short any lines, particularly the power line to the ground. A visible spark may cause enough shock waves to kill several ICs.

In The Next Issue: Track Testing With A Helping Program

Then you assemble and run the DISKTEST.ASM, an assembly language program which will be listed in the next issue of the Computer Shopper with the scope hooked up to the head signal. For this experiment you should use alignment diskette if you have one. If not, use a disk known to have an accurate track pattern, that may be a distribution disk with tracks recorded by an expensive, specially built duplicator. We shall put an end to this experiment next month. ●

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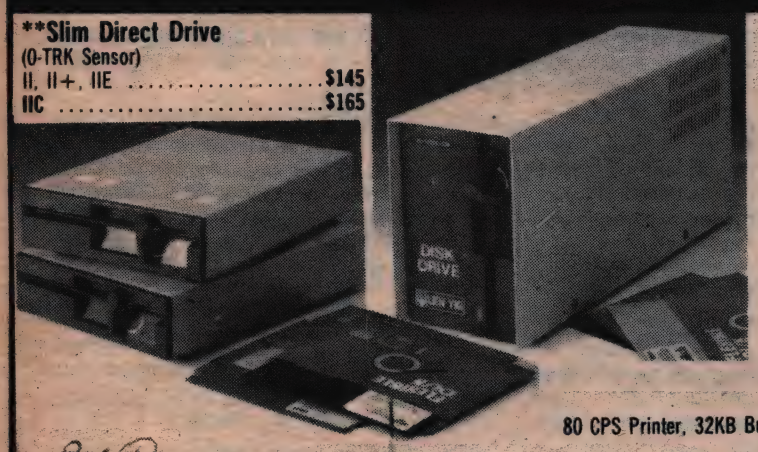

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Bruce & James — Noted For Wordvision Carries On By Selling "Eyes-Open Vaporware"

Last year, Bruce & James, publishers of the Wordvision writing tool program, became perhaps the computer industry's smallest "event marketers" by holding a press conference in a Silicon Valley McDonalds restaurant. Now, the iconoclastic firm is intentionally selling "vaporware" (software promised but not yet completed) - but with a twist.

To finance development of enhancements to Wordvision, Bruce & James offered its customers an opportunity to subscribe to a series of planned enhancements, including a spelling checker, merge-printing, and other requested features. This offer of "eyes-open vaporware" has produced enough funds to begin development of the enhancements, known as Wordvision PowerPacks. The first is expected to be an integral spelling checker.

"Instead of promising software and not delivering, we told our users the truth, and turned our lack of development funds to the customer's advantage", said company president Jim Edlin. "Those who subscribe receive substantial discounts on their PowerPacks, to thank them for making the enhancements possible", Edlin added.

Bruce & James' "McDonalds press conference" was cited by columnist Paul Franson in a recent issue of Computer & Electronics Marketing magazine, alongside examples of event marketing from Apple, Lotus and Data General. At the press conference, Bruce & James president Jim Edlin called Wordvision the "'Hill Street Blues' of software" - a cult favorite with top ten market potential. Edlin continues to see Bruce & James as "the little software company that could", surviving setbacks that have toppled companies with substantially more resources.

"We're still operating from my kitchen table, but gradually recovering from some of last year's problems" said Edlin, referring to his firm's woes with creditors and a former distributor. "People have even expressed surprise that we're still in business. But monthly sales have been rising for a year, the fan mail keeps coming in, and we remain confident and committed", Edlin said.

Wordvision, a fully featured, easy to use writing program for IBM and compatible personal computers, has won praise from many reviewers and its highly enthusiastic users. The program retails for $49.95, and includes a highly visual user interface, extensive on-line help, and features like "undo" and "swap" not found in more expensive word processors. The program is available directly from Bruce & James, which promises a full refund to anyone dissatisfied with Wordvision after trying it for 10 days.

For more information contact Bruce & James, Program Publishers, Inc., at 2355 Leavenworth Street, Suite 103, San Francisco, CA, 94133. Their MCI Mail address is WORDVISION, and their telephone number is 415-775-8400.

Mention that you read about it in the *Computer Shopper*. ●

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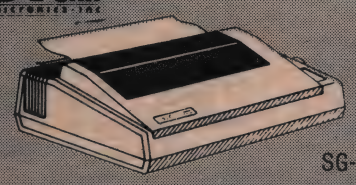

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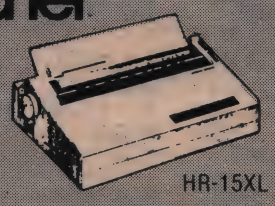

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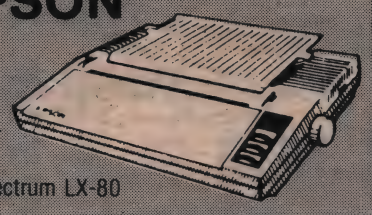

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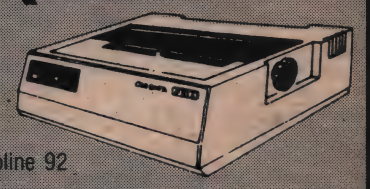

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Inside the VIC-20
Continued from page 122

with "true" 4040 formatted disks).

The 1571 uses a modified form of the 4040 format. Normally, the 4040 format is a single sided disk. The 1571 uses a double sided drive used to double storage capacity, yet density stays the same. This allows the 1571 to read and write 4040 format disks. Although it apparently can be programmed internally to read and write double density, technically, it is a Double Sided, Single Density drive (DSSD). Try finding floppy disks set up for that format! (DSDD disks will work just fine, so relax.)

The 1571 Drive

The new 1571 disk drive will be pretty popular with VIC/64 users, as well as C-128 owners, for a variety of reasons. For one thing, since it's a double-sided drive, it will automatically double your storage capacity. Instead of the familiar 170K, or 664 "blocks free" of a 1541 disk, you will have 360K or 1328 "blocks free" on a 1571 formatted floppy. Second, the drive uses the standard serial bus interface so you can plug it right into your VIC/64 with no extra hardware needed. Third, this drive will transfer data at a much higher rate (5-10 times faster than 1541) than the 1541. The 1572 will be a dual drive version of the 1571.

The only disadvantage is that the 1571/72 will still be as slow when used with the VIC/64. To get it up to full speed you must use it with the C-128 in either the 128 or CP/M mode. I imagine that we'll eventually see some type of third party software/hardware that will speed the drive up for your regular VIC or 64, though.

IEEE Units

If you need even larger storage, you might want to add an IEEE-488 adapter to your 64. The IEEE adapter, alone, doesn't increase your disk storage. But, once you have the adapter, you can then connect larger and faster drives to your VIC or 64.

Some 1541-type drives are available with an IEEE interface. The old 4040 (now out of production) was the equivalent of two 1541 format drives hooked together. Commodore now markets the 2031 drive, which is a single drive and looks just like the 1541. Other manufacturers have also offered single drives and attempted to "improve" on the 1541 by offering a compatible format and supposedly a better drive. MSD, for example, makes single and dual floppy drives that have both the VIC/64 serial and IEEE interfaces built-in.

Although these drives give you faster LOADs and SAVEs than the 1541, they still limit you to 170K per disk. Since you can now get disk "speed up" programs that make your 1541 perform as fast as an IEEE device for a fraction of their cost, I see no real advantage to them. On the other hand, the large storage capacity of the other Commodore IEEE drives (500-1000K) that Commodore used to produce for its business line of computers is definitely worth considering. (Yes, Virginia, at one time Commodore did make serious business machines.)

I like dual drive units because they make it simple to generate a back-up copy of a non-protected disk. Anyone who has used the painfully slow "1541 Back-up" program (the original one written in BASIC) would be amazed at the ease of using a dual drive unit to do back-ups. It's merely a matter of putting a master disk in one drive, a blank disk in the other, and issuing a "Duplicate" command. The drive will then automatically generate a complete disk backup without any further intervention from you. No more half-hour disk copy sessions!

Commodore's Big Ones

It became apparent to Commodore that the 170K 4040 format disks were too small for the average business user. So they developed a new line of drives that were introduced in the 1979-1980 period. The new drives used a different format for larger storage. The first of these drives was the 8050. It used a Single Sided Quad Density (77 track) 5¼-inch drive. This increased per disk capaci-

Continued on page 136

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Inside the VIC-20
Continued from page 134

ty to over 500K per disk.

After the 8050, the 8250 drive appeared. It used a Double Sided Quad Density drive (DSDQ) that allowed over a Megabyte to be stored on a single floppy. Although the 8250 uses the 8050 type format, they are not totally compatible. You can read 8050 disks in an 8250 drive, but not vice-versa.

At the time these drives were introduced, Commodore considered using an 8" drive to increase storage capacity, and even sold a few 8 inch drives overseas. But, in the U.S., they decided to stick with the highest capacity 5¼-inch floppy drives ever offered by a manufacturer, and stayed so for quite a while, although 800-1000K floppies for other computers are now commonplace.

You can order an 8050 disk drive from Protecto (and get a printer and B-128 as a bonus... address at end of article) for $800 or so. Since each 8050 disk holds around 500K of information, that's a whole megabyte of on-line storage for under a $1000. If you are interested, better act quick, because they are going fast and are already out of production.

The 8250 disk units, when you can find them, are selling for $850-1000 used. That's two megabytes for under $1000.

The Unique SFD-1001

If you aren't interested in spending quite that much money, there's another alternative. For a while, Commodore quietly mentioned the possibility of a single drive, Double Sided, Quad-density (DSQD) unit that looked like a 1541, or 2030 from the outside. It was literally "half an 8250." The drive had almost a Megabyte of storage per disk and used the IEEE bus just like its "big brother." They called it the "SFD-1001." I guess the "SFD" stood for "Super-Fast Drive" or something. I thought it was "vaporware" for a long time.

Now, it seems that Commodore has finally released some inventory of these drives. Several dealers are now selling the "SFD" for under $400. If you add in the price of an IEEE interface like the "C-Link" or "BUS Card," and a cable and you have got around $550 or so for the system. That's too high for many 64 owners, but for some, it is reasonable price for a fast, high capacity disk drive. Of course, you still have the problem of making backups with a single drive, so you might keep that in mind.

If you eventually plan on upgrading to a hard disk unit, it might be nice to have a high capacity floppy available in order to make backups of your hard disk. Using the SFD-1001, you could back up a 5 Meg. drive with 5 floppies. A 10 Meg. would take 10 floppies and so on.

High Capacity Disks And Software Woes

Of course, if you decide to go with an 8050, 8250, or "SFD" drive, you will have to convert your disks over to the new format in order to use them. Remember, the 8250 format is incompatible with the 1541/4040 format. Unless you are dealing with heavily protected software, this shouldn't be much of a problem. You merely "LOAD" a

Continued on page 138

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PROMAL
Continued from page 54

cannot be transported into programs for use as compiled procedures or functions. This was felt to be a major shortcoming.

The PROMAL Executive supports I/O redirection and addresses C-64 devices with single letter names, like S for screen and P for printer. The user can direct output for listing by simply entering at the prompt: TYPE (program name) > P <R>. However, unless you can use the RS232 port, one of the most versatile devices - the modem - is left out. There is a mini-terminal program in the library for those who have a modem using RS232, but most C-64 users have Commodore modems or similar units which require I/O by way of the User Port. Anyone who wants to write programs for Bulletin Boards will have to refer to a machine language subroutine (which PROMAL can call directly, if you have one) or write his own procedure for addressing input and output to the User Port. Given today's heavy reliance on electronic mail and program transfers, this omission was extremely limiting. The same is true for the disk drive. PROMAL will only support dual drives using numbers 0 and 1 (e.g. the MSD drives). It will not support dual Commodore 1541 units!!! For a system so carefully designed for Commodore users, these problems seem incredible.

Commands issued in the Executive can be in upper or lower case, but punctuation is important. File names must follow a rigid convention, but the user will find the limits easy to accept and remember. Multiple programs can be loaded into memory simultaneously, and the Executive will place them at the next available location. Macro commands may be used via the "JOB" command, using disk files instead of keyboard entry. Compiled programs load and run directly from the Executive by typing in the filename and hitting RETURN. We found ourselves wishing often that the power of the Executive had been included in the Library.

The Editor

Programs are entered and changed in PROMAL using the Editor. This is the most powerful feature for the programmer and provides full screen editing with several menu driven commands to make life simpler. If the user enters F1 (= EDIT) and RETURN from the Executive, the system will return a blank screen 20 lines in length waiting for program input to be typed into the system.

At the bottom of the screen are the menu prompts for user selection at any time, as shown in Figure 2. The INSERT and DELETE functions are especially useful during long editing sessions.

RECALL lets you obtain a file from the disk for entry into the current program (an action frequently useful, since PROMAL allows use of programs, procedures and functions anywhere and anytime, as long as all the variables, including arrays, have been declared in advance). Block moves and "cut and paste" are made simple with the editor commands, and F8 = QUIT allows the user one of five options at the end of the session, to save, replace, discard, etc. As noted earlier, the system loads into memory and sets aside a workspace which is used automatically by the editor. Unless you force the system to disk, actions and commands are very fast and give the programmer a feeling of freedom from the usual drudgery of system manipulation. There

Continued on page 139

```
--------------------------------------

          (20 blank lines for input)

--------------------------------------
  (Comments go here from system)
  Line =1
F1=DEL LN   F3=MARK     F5=FIND     F7=HELP

F2=INS LN   F4=RECALL F6=CHANGE F8=QUIT

--------------------------------------
```

FIGURE 2. EDITOR SCREEN

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Sakata Color SC-100	$225
Sakata Color SC-200	$419
Sakata Color SC-300	$633
Sakata Green SG-1000	$108
Sanyo DMC 6500 RGB/Green	$259
Synco Amber or Green	$ 94
Taxan Amber	$120
Taxan Green	$125
Taxan RGB Vision 3	$397
Taxan 210 Color	$249
Taxan 440 Color	$559
Taxan 12" IBM Amber	$136
Taxan 12" IBM Green	$128
Taxan 12" RGB 400	$262

TERMINALS:

Adds Viewpoint	$ 441
Adds Viewpoint 60	$ 533
Adds Viewpoint 90	$ 934
Adds Viewpoint Color	$1068
Qume 102 Terminal	$ 449
Qume 108 Terminal	$ 566

Terms: Any order may be returned within 30 days for full credit subject to a 10% restocking fee. Stock situations may vary. All prices reflect a 3% cash discount. NYS residents add 8.25% sales tax. Personal/corporate checks — allow 2 weeks to clear. Prices do not include shipping and handling charges unless order is prepaid by cash, certified check or money order. Computer sales are not subject to free shipping. Mastercard and Visa do not qualify as prepaid orders. Purchase orders are accepted with prepayment only, except for government agencies. Prices are subject to change without notice. We are not responsible for typographical errors.

References: Barclays Bank of New York (718) 454-1900, D & B # 130151913.

800-227-6647

#22

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VISA

Order desk open 7 days a week!

Inside the VIC-20
Continued from page 136

program from your 1541, and then "SAVE" it to the 8050. Data files and ML programs require using utilities like Jim Butterfield's "Copy All".

But, alas, most copy protected disks won't allow you to change the disk format. That means a lot of commercial software won't work with the SFD or 8050. The Pro-Line software company (in Canada...where else?) has taken this problem into consideration. You see, Pro-Line knows that the old 8050/8250s are about the best thing since sliced bread for Commodore owners. Pro-Line is actually three of the greatest Commodore programmers in the world...Brad Templeton, Steve Punter, and Jim Butterfield!

They have written a fine word processor (WP-64), a spelling checker, a mailing list/data manager, the PAL assembler, and POWER BASIC aid program. All of these are excellent programs. The real kicker is that each program retails for just $49.95 each! They also offer package deals that make the software even cheaper.

Pro-Line sells all of their C-64 software in 8050/8250 format. That means you can get all of their great software and run it on your 64 using the 8050 or SFD drive. You will have to contact Pro-Line directly and custom order the software. Their address is at the end of this article.

So, at last, we can add a good sized disk drive to our 64s and still get some great commercial software that runs on it.

Other Options

If you are not in a big rush to upgrade your 64, though, it might be wise to wait and hold on just a little bit before you run out and buy one of these high capacity floppy drives. You see, for the price of one of these floppy drives, you will soon be able to get a Winchester hard disk that has 10-20 times the storage capacity for the same price! We'll take a closer look at hard disk storage for your Commodore next month.

Products and Addresses

Product: Numerous Software Packages for 8050 format.

Address: Pro-Line Software
755 The Queensway East
Unit 8
Mississaugua, Ontario
Canada L4Y 4C5
(416)-273-6350
Price: $49.95 each

Product: SFD - 1001 Disk Drive
Address: Progressive Peripherals and Software
2168 South Holly
Suite 200
Denver, CO 80222
(303)-759-5714
Price: $399.95

Product: B-128, 8050, 4023 Combo Package

Address: Protecto Enterprizes
Box 550
Barrington, Il 60010
(312)-382-5244
Price: $795.00 + $50 S/H

As a service to Shopper readers, I am offering the latest version of the Parallel Printer Driver program and Assembler source code on disk or tape for a minimal handling charge. Send a stamped, self-addressed, mailer, along with your disk or tape and two dollars (or just send five dollars) to:

Ted Drude
226 F. St. HSC
Cedar Falls, IA 50613
Attn.: Disk Offer

Address all other correspondence to me, C/O the *Computer Shopper*. ●

```
100 REM CENTRONICS PRINTER DRIVER
110 :
112 REM FOR THE COMMODORE 64 ONLY
114 :
120 REM VERSION 2.1 - 04/15/85
130 :
140 REM COPYRIGHT (C) 1984, 1985 BY
150 :
160 REM TED DRUDE
170 :
180 REM ALL RIGHTS RESERVED
190 :
200 PRINT CHR$(147)
210 PRINT:PRINT:PRINT
220 PRINT " LOADING THE DRIVER INTO RAM AT $C000..."
240 GOSUB 900
250 PRINT "    IF SUCESSFULLY LOADED, ENABLE WITH "
260 PRINT
270 PRINT "              'SYS 12*4096'."
280 PRINT
290 PRINT "    OPEN PRINTER WITH SECOND ADDRESS "
300 PRINT "     OF '1' FOR EXTRA LINEFEED."
310 PRINT
320 PRINT "         (E.G. 'OPEN 4,4,1') "
500 END
800 :
890 REM LOAD THE CENTRONICS DRIVER
899 :
900 REM BLOCK # 1
901 FOR LOC= 49152 TO 49290 :READ DA:POKE LOC,DA:CK=CK + DA:NEXT LOC
910 IF CK <> 16777 THEN PRINT "ERROR IN BLOCK # 1 "
912 CK=0
914 :
920 REM BLOCK # 2
921 FOR LOC= 49291 TO 49427 :READ DA:POKE LOC,DA:CK=CK + DA:NEXT LOC
930 IF CK <> 17150 THEN PRINT "ERROR IN BLOCK # 2 "
932 CK=0
934 :
940 REM BLOCK # 3
941 FOR LOC= 49428 TO 49554 :READ DA:POKE LOC,DA:CK=CK + DA:NEXT LOC
950 IF CK <> 17470 THEN PRINT "ERROR IN BLOCK # 3 "
952 CK=0
954 :
960 REM BLOCK # 4
961 FOR LOC= 49555 TO 49691 :READ DA:POKE LOC,DA:CK=CK + DA:NEXT LOC
970 IF CK <> 11927 THEN PRINT "ERROR IN BLOCK # 4"
980 :
990 RETURN
1000 :
1002 REM DATA STATEMENTS
1004 :
1005 REM BLOCK # 1
1006 :
1010 DATA 162,251,160,193,56,32,141,255
1020 DATA 173,174,193,208,40,169,255,141
1030 DATA 174,193,162,17,189,1,194,157
1040 DATA 91,192,202,16,247,173,15,194
1050 DATA 174,16,194,141,87,192,142,88
1060 DATA 192,173,9,194,174,10,194,141
1070 DATA 81,192,142,82,192,162,17,189
1080 DATA 73,192,157,1,194,202,16,247
1090 DATA 162,251,160,193,24,32,141,255
1100 DATA 96,109,192,197,192,247,192,21
1110 DATA 193,0,0,50,193,65,193,0,0,157
1120 DATA 193,0,0,0,0,0,0,0,0,0,0,0,0
1130 DATA 0,0,0,0,0,0,165,184,208,5,169
1140 DATA 6,76,208,193,165,186,205,173
1150 DATA 193,240,3,108,91,192,166,184
1160 DATA 32,176,193,208,5,169,2,76,208
1161 :
1162 REM BLOCK # 2
1163 :
1170 DATA 193,166,152,224,10,144,5,169
1180 DATA 1,76,208,193,230,152,157,89
1190 DATA 2,165,185,141,172,193,157,109
1200 DATA 2,165,186,157,99,2,169,255,141
1210 DATA 3,221,173,0,221,9,4,141,0,221
1220 DATA 173,2,221,9,4,141,2,221,169
1230 DATA 16,141,13,221,24,96,32,181,193
1240 DATA 240,2,24,96,32,192,193,165,186
1250 DATA 205,173,193,240,5,165,184,108
1260 DATA 93,192,198,152,228,152,240,20
1270 DATA 164,152,185,99,2,157,99,2,185
1280 DATA 109,2,157,109,2,185,89,2,157
1290 DATA 89,2,24,96,32,176,193,240,5
1300 DATA 169,3,76,208,193,32,192,193
1310 DATA 165,186,205,173,193,240,5,166
1320 DATA 184,108,95,192,169,6,76,208
1321 :
1322 REM BLOCK # 3
1323 :
1330 DATA 193,32,176,193,240,5,169,3,76
1340 DATA 208,193,32,192,193,165,186,205
1350 DATA 173,193,240,5,166,184,108,97
1360 DATA 192,133,154,24,96,165,153,205
1370 DATA 173,193,240,3,108,101,192,169
1380 DATA 6,76,208,193,141,175,193,165
1390 DATA 154,205,173,193,240,6,173,175
1400 DATA 193,108,103,192,138,72,152
1410 DATA 72,173,172,193,208,9,173,175
1420 DATA 193,32,128,193,76,119,193,201
1430 DATA 1,173,175,193,32,128,193,201
1440 DATA 13,240,3,76,119,193,169,10
1450 DATA 32,128,193,104,168,104,170
1460 DATA 173,175,193,24,96,72,173,13
1470 DATA 221,41,16,240,249,104,141,1
1480 DATA 221,173,0,221,41,251,141,0
1481 :
1482 REM BLOCK # 4
1483 :
1490 DATA 221,9,4,141,0,221,173,1,221
1500 DATA 96,165,153,205,173,193,240
1510 DATA 3,108,107,192,169,6,76,208
1520 DATA 193,0,4,0,0,169,0,133,144,138
1530 DATA 166,152,202,48,5,221,89,2,208
1540 DATA 248,96,189,89,2,133,184,189
1550 DATA 99,2,133,186,189,109,2,133
1560 DATA 185,96,72,32,204,255,160,0
1570 DATA 36,157,80,18,185,239,193,32
1580 DATA 210,255,200,201,12,208,245
1590 DATA 104,72,9,48,32,210,255,104
1600 DATA 56,96,73,47,79,32,69,82,82
1610 DATA 79,82,32,35,32,0,0,0,0,0,0
1620 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0
1630 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0
```

```
10 REM CENTRONICS PRINTER DRIVER
20 REM FOR VIC-20 WITH NO RAM EXPANSION
30 REM COPYRIGHT (C) 1985 BY TED DRUDE
40 REM ALL RIGHTS RESERVED
45 REM VERSION 2.2 - 4/29/85
50 FOR LOC = 6656 TO 7176 : READ DA :POKE LOC ,DA  :CK=CK+DA :NEXT LOC
60 IF CK<>50843 THEN PRINT"ERROR IN DATA STATEMENTS":STOP
70 IF PEEK(56)>29 GOTO 90
75 POKE 55,255:POKE56,25
80 POKE 643,255:POKE644,25
90 SYS 6656
95 CLR:NEW
100 DATA 162,232,160,27,56,32,141,255
110 DATA 173,155,27,208,40,169,255,141
120 DATA 155,27,162,17,189,238,27,157
130 DATA 91,26,202,16,247,173,252,27
140 DATA 174,253,27,141,87,26,142,88
150 DATA 26,173,246,27,174,247,27,141
160 DATA 81,26,142,82,26,162,17,189,73
170 DATA 26,157,238,27,202,16,247,162
180 DATA 232,160,27,24,32,141,255,96
190 DATA 109,26,191,26,241,26,15,27,0
200 DATA 0,44,27,59,27,0,0,138,27,0,0
210 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0
220 DATA 0,0,165,184,208,5,169,6,76,189
230 DATA 27,165,186,205,154,27,240,3
240 DATA 108,91,26,166,184,32,157,27
250 DATA 208,5,169,2,76,189,27,166,152
260 DATA 224,10,144,5,169,1,76,189,27
270 DATA 230,152,157,89,2,165,185,141
280 DATA 153,27,157,109,2,165,186,157
290 DATA 99,2,169,255,141,18,145,173
300 DATA 28,145,41,15,9,160,141,28,145
310 DATA 169,16,141,30,145,24,96,32,162
320 DATA 27,240,2,24,96,32,173,27,165
330 DATA 186,205,154,27,240,5,165,184
340 DATA 108,93,26,198,152,228,152,240
350 DATA 20,164,152,185,99,2,157,99,2
360 DATA 185,109,2,157,109,2,185,89,2
370 DATA 157,89,2,24,96,32,157,27,240
380 DATA 5,169,3,76,189,27,32,173,27
390 DATA 165,186,205,154,27,240,5,166
400 DATA 184,108,95,26,169,6,76,189,27
410 DATA 32,157,27,240,5,169,3,76,189
420 DATA 27,32,173,27,165,186,205,154
430 DATA 27,240,5,166,184,108,97,26,133
440 DATA 154,24,96,165,153,205,154,27
450 DATA 240,3,108,101,26,169,6,76,189
460 DATA 27,141,156,27,165,154,205,154
470 DATA 27,240,6,173,156,27,108,103
480 DATA 26,138,72,152,72,173,153,27
490 DATA 208,9,173,156,27,32,122,27
500 DATA 76,113,27,201,1,173,156,27
510 DATA 32,122,27,201,13,240,3,76,113
520 DATA 27,169,10,32,122,27,104,168
530 DATA 104,170,173,156,27,24,96,72
540 DATA 173,29,145,41,16,240,249,104
550 DATA 141,16,145,173,16,145,96,165
560 DATA 153,205,154,27,240,3,108,107
570 DATA 26,169,6,76,189,27,0,4,0,0
580 DATA 169,0,133,144,138,166,152,202
590 DATA 48,5,221,89,2,208,248,96,189
600 DATA 89,2,133,184,189,99,2,133,186
610 DATA 189,109,2,133,185,96,72,32
620 DATA 204,255,160,0,36,157,80,18
630 DATA 185,220,27,32,210,255,200,201
640 DATA 12,208,245,104,72,9,48,32,210
650 DATA 255,104,56,96,73,47,79,32,69
660 DATA 82,82,79,82,32,35,32,0,0,0
670 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0
680 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0
690 DATA 0,0
```

Commodore Disk Drives

(Units are grouped according to their media compatibility.)

Model	# of Drives	DOS	Format	Capacity	Bus
2040 Format Family					
2020	2	1.0	SSSD	170K (x 2)	IEEE
3030	2	1.0	SSSD	" (x 2)	IEEE
4040 Format Family					
4040	2	2.1+	SSSD	170K (x 2)	IEEE
2031	1	2.6	SSSD	"	IEEE
2031LP	1	2.6	SSSD	"	IEEE
1540	1	2.6	SSSD	"	Serial
1541	1	2.6	SSSD	"	Serial
1542	1	2.6	SSSD	"	Serial
SFS-481	1	???	SSSD	"	(See Note)
1571	1	???	DSDD	360K	Serial
1572	2	???	DSDD	360K (x 2)	Serial
8050 Format Family					
8050	2	2.5	SSQD	500K (x 2)	IEEE
8250	2	2.7	DSQD	1 Meg. (x 2)	IEEE
SFD-1001	1	???	DSQD	1 Meg.	IEEE
9090 Format Family					
9060	1	???	Winchester	5 Meg.	IEEE
9090	1	???	Winchester	7.5 Meg.	IEEE

Table 1 - Commodore Disk Drive Systems

(Note: The SFS-481 is a non-IEEE parallel drive that works with the "Plus/4" computer only. It was probably never produced in quantity.)

PROMAL
Continued from page 137

are many control key functions to speed work, including a 'CTRL B' which allows the user to backtrack along the editing job by recalling the last line entered, then the next-to-last, etc. Very interesting! A unique characteristic of the PROMAL Editor is its ability to scroll only the line being edited, so that the full 80 columns can be used and seen on that line only while the remainder of the screen remains untouched. This makes the display much faster and far less distracting.

One of the nicest functions on the Editor is a FIND function which will take you directly to keywords in the program under EDIT. A similar capability is the CHANGE key, which will do global search and replace for one or as many occurrences of an expression as the user desires. All in all, this editor is one of the finest we have seen for programmers. It has a few disturbing features, like allowing FIND only "down" the listing and requiring the user to key in CTRL-B (ALPHALOCK) to stay in upper case mode each time the Editor is quit and re-entered, but these shortcomings can be overlooked for serious program applications.

The Library

The third element of the system loaded as part of the initial program is the Library, a collection of often used routines which can be called directly by any PROMAL program which "INCLUDES" the Library explicitly. Since the Library contains so many powerful procedures and functions, it seems odd that the developers did not include it as a normal part of the program unless the user declared it to be omitted. Instead, the user must make a special line in each program that will use the Library (INCLUDE LIBRARY) or these predefined routines are not available. When included, the Library is compiled as part of the program and routines such as Block Move, CURSET (position cursor), GETL (get a line from keyboard), and OUTPUT (formatted output) may be called and used directly.

One of the most powerful features of PROMAL is its ability to use individual routines in a "mix or match" approach to programming. For example, once you have written a procedure to change screen color, you may use it in any other program you write by simply block moving it, along with its variables (always required!) into the new program. Since the language also allows recursion (calling a routine within itself), small building blocks can be used over and over to build very complex processes with a minimum of program development. The Library serves a key role in this approach and should be one of the most useful aspects of PROMAL. It can be improved upon and allows user additions to provide custom routines which can be made available with a single INCLUDE statement.

The Compiler

The PROMAL Compiler, advertised as the "heart" of the system, is an extremely straightforward and user friendly element which remains on disk until it is needed for the first time in a session. It then loads automatically when called (it takes about a minute to boot up) and compiles your program line by line. The display gives status, counts lines as they are compiled, indicates the procedure or function under compilation, and stops when an error is detected. An extensive error code set, explained in the PROMAL User's Guide, gives the programmer good guidance in most areas where problems occur. The line number and approximate place where the offending expression may be found is given, along with a prompt to permit return to EDIT (Y/N). When the Compiler completes its job, the resulting program (file extension .C) can be run directly from the Executive or sent to disk for SAVE. For revisions to existing files, the Compiler asks whether you want to replace or not (Y/N).

Except for a little less speed than compilers such as PASCAL, we found this feature to be a significant strength in PROMAL. It was the easiest to use area of the system and provided the most help in locating programming problems and solutions.

The Developer's System

This final element in the PROMAL system provides the program developer the capability to compile custom programs and "install" them on a PROMAL disk which is essentially read-only to the

Continued on page 144

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Any pair of $49.95 Disk Drives in a case with Power Supply built in $200 + UPS
Tandon 100-1 pair in case with built in Power Supply ..... $212 + UPS
ST506 Seagate Technology 5mb Disk Drives, OEM Surplus .. $150 + UPS
Monitors Ball 15" Model BC-500. Amber or green screen. New!! 1200 lines resolution. 32 MHZ bandwidth, DC power required 24V DC @ 1.25 Amps. Non-composite. Requires TTL level signals. 15.750 KHZ or 19,200 KHZ Horz. Excellent for 820, Big Board, etc. with manuals. Ship weight 19 lbs. New in original cartons. ..... $109 + UPS
System case for above monitors. High impact plastic with detached low profile keyboard. ASCII encoded with numeric pad, function keys, escape, etc. All hardware for mounting monitor etc. Modern Pedistal design. Room for 820, Big Board, and other single board systems. Even possibly room for small S-100 system. Beige and brown. These are NEW! ..... $175 + UPS
Monitors - Ball Bros. Equivalent for Xerox 820 and other single board systems. 15.750 Kc horizontal freq., 16 MHZ Bandwidth ..... $65 + UPS
Disk Drive cases w/Power Supply for:
2-5¼" Reg. Hgt. Drives ..... $62.50 + UPS
2-5¼" Half Hgt. Drives ..... $60 + UPS
1-5¼" Reg. Hgt. Drives ..... $50 + UPS
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For 2 Half Hgts. ..... $14.50 + $5 Packing & Shipping
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- ASCII and Binary Files
- Fast Machine Code

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Applying The Atari
Continued from page 58

reason is that the Atari features numerous non-ASCII characters which can be placed in a program. ASCII characters form the American Standard Code for Information Interchange. Virtually all printers can print the ASCII characters. "ATASCII" is short for Atari ASCII, and includes most of the ASCII characters but also contains Atari's special characters. These characters include all the control key graphics characters, the inverse video characters, and the cursor control characters. Often a program uses inverse video to highlight words, or a wide variety of characters representing machine language code in a USR statement. When these are listed to the printer, the printer might substitute its own characters for the codes it receives, or it might interpret some of the characters as control codes and do unpredictable things.

The non-printable Atari characters presented a problem to me, as a programmer, when copyrighting software. To obtain a copyright, the Library of Congress requires, among other things, a listing of the program. (Unfortunately, they don't deal with disks or cassettes yet.) However, my program was 20% BASIC and 80% machine language stored as characters in USR statements. I needed a routine to print these characters, and thus the *ATASCII* Lister evolved. It can, of course, be used for any application requiring an exact listing of an Atari program.

The *ATASCII Lister* uses the high-resolution graphics capability available on most of today's printers to print the Atari's characters. It will work with the Epson MX-80, MX-100, FX-80, RX-80, Gemini 10X, 15X or graphics-compatible printer.

```
10 REM This program listing was generated by ATASCII Lister.
20 REM Note how all of the Atari's characters can be printed.
30 REM Even graphics characters are printed:
40 REM ├┣┤┐╱◢▲▀▔▁┼┌─┼◘┘┬┤ └
50 REM Control characters too:
60 REM ␛↑↓←→◀◀▶▶▶▶▶
70 END
```

"Figure 1"

Using the Program

Enter the program and SAVE it to cassette or disk. Next, load in the program that you wish to list and LIST it to cassette or disk with the LIST"C" or LIST"D: filename" command. When you SAVE a program, the program is saved in its tokenized form, which means that BASIC words such as PRINT and GOTO saved as single byte codes. By LISTing the program, each character is saved as is (i.e. PRINT is saved as five bytes for the "P," "R," "I," "N," and "T"), thus making it readable by our *ATASCII Lister* program.

ATASCII Lister

```
EEJ 10 REM ATASCII LISTER
KFJ 20 REM COPYRIGHT 1985 JEFF BRENNER
NTJ 30 OPEN #3,8,0,"P:"
KYJ 40 RESTORE 290:FOR I=0 TO 218:READ N:POKE 1536+I,N:NEXT I
RJJ 50 DIM N$(15),DN$(17),TMP$(2040),C$(120),D$(1),E$(1),MS$(30):POKE 766,0
HGJ 60 DN$="D:":OPEN #1,4,0,"E:"
VWJ 70 PRINT "■ASSETTE OR ■ISK";:INPUT E$:IF E$="C" THEN DN$="C":GOTO 90
QCJ 80 PRINT "FILENAME: D:";:INPUT #1;N$:IF N$(1,2)="D:" THEN N$=N$(3,LEN(N$))
AHJ 90 DN$(LEN(DN$)+1)=N$:OPEN #2,4,0,DN$:GOTO 110
LIJ 100 PRINT "ERROR #";PEEK(195):GOTO 80
LZJ 110 TRAP 110:PRINT "DENSITY (1-2): ";:INPUT #1;D:IF D<1 OR D>2 THEN 110
YZJ 120 RESTORE 120:FOR I=1 TO D:READ C:NEXT I:D$=CHR$(C):DATA 75,76
HZJ 130 TRAP 130:PRINT "CHARACTERS PER LINE (NORM=38) ";:INPUT #1;CPL
QFJ 140 CL=CPL*8:H1=INT(CL/256):L1=CL-H1*256
MQJ 150 TRAP 260:POKE 766,1:INPUT #2;C$:PRINT C$:LN=LEN(C$):C=1
LVJ 160 C$(LEN(C$)+1)=CHR$(155):TMP$(1)=CHR$(0):TMP$(2040)=CHR$(0):TMP$(2)=TMP$
SXJ 170 A=USR(1536,ADR(C$),ADR(TMP$)):I=0:L=1:A=USR(1716,ADR(TMP$))
IEJ 180 TRAP 270:PRINT #3;CHR$(27);CHR$(64);:I=0:L=1
HPJ 190 IF LN<(CPL+1) THEN 230
GTJ 200 LN=LN-CPL
EXJ 210 TRAP 270:PRINT #3;CHR$(27);CHR$(64);CHR$(27);D$;CHR$(L1);CHR$(H1);
NAJ 220 PRINT #3;TMP$(I*8+1,(I+CPL)*8);CHR$(10);:I=I+CPL:GOTO 190
ABJ 230 K=LN*8:H=INT(K/256):L=K-H*256
BGJ 240 TRAP 270:PRINT #3;CHR$(27);CHR$(64);CHR$(27);D$;CHR$(L);CHR$(H);
MHJ 250 PRINT #3;TMP$(I*8+1,I*8+K+1);CHR$(10);:GOTO 150
WEJ 260 PRINT "END OF LISTING.":CLOSE #3:END
GJJ 270 PRINT "RESET PRINTER - PRESS RETURN":INPUT #1;E$
VEJ 280 GOTO PEEK(186)+256*PEEK(187)
JJJ 290 DATA 104,104,133,205,104,133,204,104,133,207,104,133,206,169,0,168
AOJ 300 DATA 133,203,177,204,170,232,224,156,208,3,76,169,6,10,38,203
UEJ 310 DATA 74,201,96,176,22,201,64,176,9,201,32,176,11,105,64,76
OWJ 320 DATA 59,6,56,233,32,76,59,6,56,233,32,133,208,169,0,133
WBJ 330 DATA 209,24,162,3,24,38,208,38,209,202,208,248,24,173,244,2
COJ 340 DATA 101,209,133,209,160,7,162,1,177,208,157,171,6,136,232,224
SOJ 350 DATA 9,208,245,169,8,141,170,6,160,0,162,8,177,206,62,171
CWJ 360 DATA 6,42,145,206,202,208,245,165,203,240,6,177,206,73,255,145
DVJ 370 DATA 206,24,165,206,105,1,133,206,165,207,105,0,133,207,206,170
PTJ 380 DATA 6,173,170,6,240,3,76,106,6,24,165,204,105,1,133,204
DPJ 390 DATA 165,205,105,0,133,205,76,13,6,96,0,0,0,0,0,0
GWJ 400 DATA 0,0,0,0
JJJ 410 DATA 104,104,133,205,104,133,204,169,154,133,206,230,206,162,8,160
CKJ 420 DATA 0,177,204,197,206,208,4,169,151,145,204,200,192,0,208,241
TOZ 430 DATA 230,205,202,208,234,96,155
```

Figure 2

Once the program has been listed, load the *ATASCII Lister* and RUN it. You are asked whether you are using a cassette or disk. If you are loading from disk, you are asked for the filename.

Next, you are asked to enter the print density. This can be a value of one or two, which corresponds to a resolution of 60 dots per inch (d.p.i.) and 120 d.p.i., respectively. Quadruple density produces characters too thin to be legible and is thus not supported by the program. **Figure 1** shows a sample program listing printed by *ATASCII Lister* in density 2.

Next, you are asked for the number of characters per line. Make sure you don't select too many characters per line for the particular resolution you chose. Each character requires eight dots. Thus, an eight-inch line printer using a 60 d.p.i. resolution can print a total of 480 (8 inches x 60 d.p.i.) dots, or 60 characters per line (480 dots per line/8 dots per character). This computation can be used to determine the maximum number of characters per line for your particluar printer and for the resolution you are using.

When the number of characters per line has been entered, the listing will be printed - in the Atari's own characters! If you get an "ERROR - CHECK DATA" message, then check the program carefully for errors. You'll get a "RESET PRINTER - PRESS RETURN" message if your printer goes off-line for some reason, such as when the paper is out. Press RETURN when the printer is back on-line.

The *ATASCII Lister* makes your printer and your Atari fully compatible. No longer will you have restrictions when you need to list programs to your printer.

Continued on page 143

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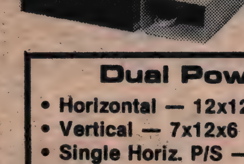

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Kennedy Approach
Continued from page 58

tures is balanced, and the traffic is limited to only one type of plane.

The next in difficulty is the Stapleton International Airport in Denver, Colorado. Here you must make sure planes clear the mountains and avoid storms.

The combination of the Dallas Fort Worth International Airport and the Dallas Love Field offers a large number of arrivals and departures to make it the third most difficult.

The next level is the Dulles International and the Washington National airports in Washington, D.C. Here, the air traffic is made up of three types of aircraft, and you must avoid passing over restricted areas including the Washington Monument and the White House.

The most challenging option is the John F. Kennedy/LaGuardia combination, with enough arrivals and departures to insure continuous perspiration and headache. I gave a shot at the Kennedy simulation only to find myself helplessly frustrated and vowing never to have anything to do with air traffic control. Since playing that skill level, I've had recurrent nightmares in which I'm responsible for 26 misguided planes, jets and Concordes all about to meet at one point and in one boom. MicroProse recommends becoming a real air traffic controller if you can handle this level.

Directing The Traffic

Once you get your job, you're presented with a control area map, in which you get a graphic view of the airstrips, the planes, and various terrain features. Additionally, this video map shows you the time (your shift ends on the hour), and flight plans for each aircraft flying or to be flying in your area.

As an air traffic controller, you can communicate with any plane on your control map by moving a cursor over the plane, or by typing the plane's ID letter on the keyboard. Positioning the cursor is much more convenient than typing on the keyboard. However, it is possible for more than one plane to reside at the same screen position at once, though at different altitudes, thus rendering it impossible to specify a particular plane with the cursor. In this case, you would have to use the keyboard.

Once you've specified a craft, you use the joystick to instruct the pilot to head in a particular direction and to reach a certain altitude. In this manner you launch all planes, direct planes already in the air, and give planes clearance to land (by specifying an altitude of zero.)

Nothing actually happens to the plane, though, until the pilot receives your message. Pressing the joystick trigger lets the magic begin. In a clear voice with excellent intonation, the computer speaks your instructions for you to the pilot, such as "Delta 707, turn left to 2-7-0, descend to 4000 feet." The pilot, in turn, responds with a "Roger," complete with radio hiss, as he proceeds to follow your exact instructions.

During play, you might be surprised by a message from a pilot, such as "Emergency! Emergency! This is Air France. Eight minutes fuel" in which you'd have to prepare for an emergency landing.

At any time you can request a pilot to identify his plane and to specify its direction and altitude. This is useful when several planes are on the screen at once, as it becomes difficult to remember the instructions given to each.

Planes can enter your air area by taking off from an airport in your city, or by entering from an adjacent city. The flight plans for each plane are listed on the screen one minute before the plane can take off, or, in the case of an arrival from another city, one minute before the plane reaches your area. The flight plans also indicate the destination of each plane. The plane might have to land at an airport in your city, or it might have to be directed to another city. The hardest part of all of this is avoiding conflicts. A conflict condition occurs when two or more planes are closer than safety standards allow. Unless two planes are 1000 or more feet apart in altitude, they must be separated from each other by three miles. If the planes do not meet this safety requirement, a conflict warning will flash on the screen. The longer you have a conflict situation, the more points you lose in your calculated rating at the end of the game. Additionally, you run the risk of having a mid-air collision.

Planes of various speeds add to the difficulty on the higher levels. You must have keen foresight in avoiding conflicts by taking into consideration that the Concorde flies two times as fast as a jet, which flies twice as fast as a light plane.

At the end of your shift, you're given your salary, and are rated on a variety of factors. Successful landings and exits, and proper handling of emergencies improve your rating while flight delays and conflict times lower it. Your new rating may earn you a promotion and extra pay, or it may lose you your job. A mid-air collision generally insures your future unemployment.

Documentation

The documentation booklet is clearly written and contains a generous number of pictures, diagrams and maps to make game play even simpler to learn. Unlike many of the manuals accompanying MicroProse's simulations, this one contains no cute technical

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Kennedy Approach
Continued from page 142

specifications and jargon. There is, however, an appendix of air traffic control terms for those interested in such.

Conclusions

Kennedy Approach is a good simulation made 300% better with the addition of the synthesized voice. The simulation appropriately and effectively uses this talking feature to add an entirely new dimension of realism, as no game has done before.

Since I am not an air traffic controller, I cannot judge the accuracy of the simulation, but it would be fair to say that the tension and the excitement have been faithfully duplicated. Another job well done, MicroProse.

Ratings For Kennedy Approach

* FAIR
** POOR
*** GOOD
**** EXCELLENT

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Value ***
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Kennedy Approach ****

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Applying The Atari
Continued from page 140

Next Month

We'll learn how *ATASCII Lister* works, enter a program to read a light pen, learn how to redefine the keys of the numeric keypad, answer more reader mail, and look at some other good stuff.

Reader's questions, comments and contributions are welcome. Please enclose a self-addressed, stamped envelope (SASE) for a personal reply.

A cassette or diskette of any program listed in this column is available from the author for $5.00, postpaid. Specify DOS or DOS 3 when requesting a diskette.

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PROMAL
Continued from page 139

user. It is offered for those who wish to make Master Disks for copy and distribution purposes, but who want to retain control over what is done with the program. The "runtime" package placed on a master disk will boot up and autoload a PROMAL compiled applications program directly. Without the other PROMAL system elements, a user would have no way to list the program or alter it in any way, so this feature provides a type of security for the programmer who decides to "share" his work with others. The procedure for making a Master Disk is simple and short. The only areas of concern are those of error recovery and return of control to BASIC for the user without PROMAL. As in each of the other sections, the documentation for this feature is complete and contains a listing of error messages and their meanings.

Language Comparisons

As noted earlier, PROMAL is a hierarchical language which requires structured programming defining each subroutine by indentation. No line numbers are used, and very strict conventions are followed for beginning and ending operations. None of these rules are particularly difficult to follow, but learning PROMAL is like learning any other computer language (or a foreign language for speaking). A certain amount of plain old memorization is required, along with reading and testing your understanding by trial and error until each command is mastered. There simply is no shortcut.

Beginning with a good understanding of BASIC and a fair working knowledge of PASCAL, it took us about three days to work through the demonstration disk and manuals to a point at which we were ready to program. We chose a simple averaging program and developed it in four languages: Commodore BASIC, MBASIC and TURBO Pascal on the C-64 running in C/PM, and PROMAL. Here are some of the things we discovered:

First, each program must be "named"' on the initial line of the program, as shown in Table 4. Next, the Library must be INCLUDED if it is to be used. Since it seemed to us that it would always be required, INCLUDE LIBRARY will probably always be in line 2. Third, all variables must be declared before they are used. PROMAL allows both global (used throughout the program) and local (used only in a subroutine) variables, and the local variables may be declared in the PROCEDURE or FUNCTION where they are used. Constants and array variables must also be declared prior to use, so long PROMAL programs may have several pages of variable declarations before the first operation is defined! After variables are declared, PROCEDURES and FUNCTIONS are defined by naming each one and structuring the variables (if local only), operations, and syntax required to make the computer do what is desired. Finally, the Main Program contains the calls and sequences to put all this definition to work in very short, concise commands.

PROMAL includes an extensive syntax reference appendix, and it will be needed. The language gets its power and speed from strictly confining naming conventions, data definitions, operators, and conditional statements (such as IF ... ELSE, and REPEAT ... UNTIL) to well defined rules. The secret is to learn the rules and to remember how to apply them. The programs in Tables 1 through 4 show similarities and differences for Commodore BASIC, MBASIC, PASCAL, and PROMAL written for the same purpose. The PROMAL version required two nights to write, debug, and compile properly starting from scratch. It can best be understood by noting the comments listed for each line which includes a ';' indicating remarks which are ignored by the compiler. PROMAL allows careful in-program documentation of what was done without taking up memory in the final executable version.

For tables 1-4 see page 156.

Several features of PROMAL became very evident quickly in the development of this short program. The system allows rapid movement in and out of the Editor, Executive, and Compiler, making program development much easier. However, the requirements for indentation are not obvious, and syntax errors kept us busy for quite a while. The Compiler will find obvious errors like failing to define a variable or leaving off one part of a conditional operation, but it will not catch errors in indentation. Some very unusual things happen when the wrong syntax makes it into the compiled program and is run! Unfortunately, error recovery is not good, and the system locked up in a full-blown crash several times. Once we lost our entire file and had to begin again because the wrong key initiated execution during troubleshooting.

Although PROMAL has obvious advantages for accomplishing certain types of programming, we chose the one (quite by chance) for which it is probably least effective. Unlike BASIC, MBASIC, or PASCAL, PROMAL will not allow direct entry of numeric data. It took us some time to realize that, in order to enter a number from the keyboard the programmer must establish an array variable and a buffer, read a

Continued on page 155

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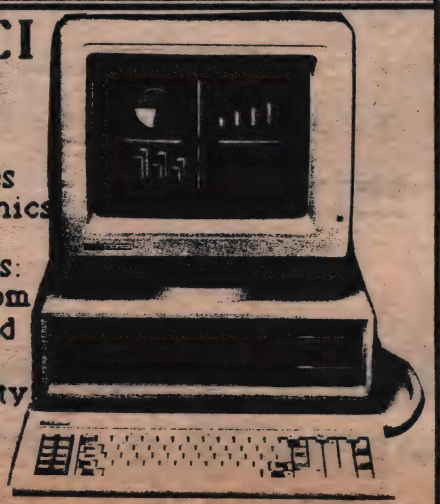

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What's New At Comdex? Continued from page 63

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Sanyo Goes PC Compatible, Reorganizes Sales Team

Sanyo has introduced a new line of IBM PC compatible desktop computers called the MBC880 Series. (Fig. 3). After selling thousands of MBC550 MSDOS computers that were able to run software specially configured for these machines and some IBM PC software, Sanyo has decided to expand their market and join the PC compatible "club". Two models are offered. The dual 360K floppy drive unit is called the 885 and the 888 supports a wide variety of mass storage media starting with a 20 Mbyte hard disk. The 8088-2 CPU is switchable between 4.7MHz and 8MHz operation. The standard RAM installation is 256K, expandable to 640K. The unit has 8 expansion slots one of which is already occupied by the color and parallel interface card. A serial communications board is optional. Sanyo has introduced a standard IBM PC-type keyboard with this model. The 880 series has a suggested list price of $1,899.

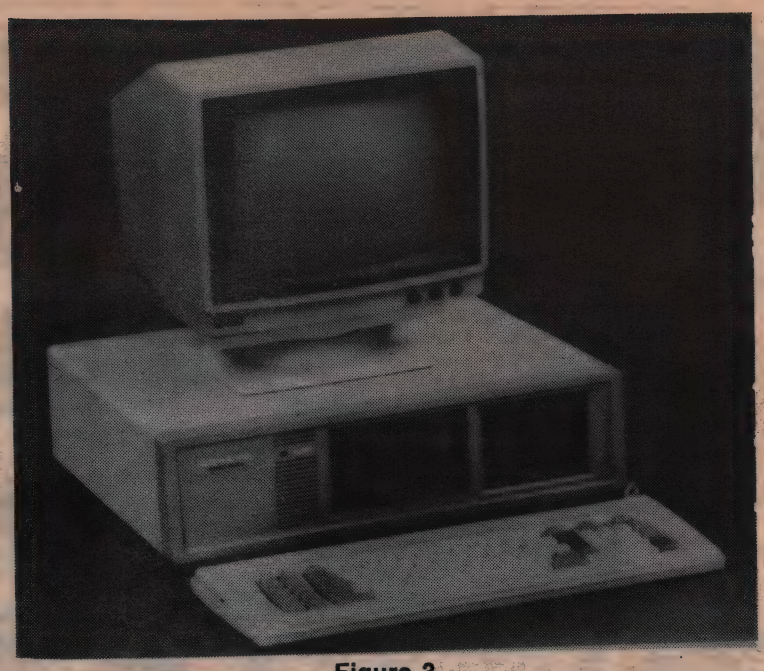

Figure 3
Sanyo 880 Series Computer

One of the major announcements made at this show was also directly connected with Sanyo. Edward Goulart the new Sanyo National Sales Manager and leader of the new Sanyo marketing team, announced that henceforth Sanyo computer products would only be sold by "authorized" dealers capable of providing adequate service and support. Major regional master distributors would be set up and requalification of all dealers would take place.

This plan seems to be aimed at the mail order dealers who sell a large part of their products in this magazine. Sanyo has sold almost 100,000 MBC550 computers in a period of time when other companies were losing sales and going out of business. They have done this without direct company advertising and with a machine that is not IBM PC compatible, although an MSDOS computer. It is truly a miracle that they have done so and the credit must go to the mail order dealers, not the store dealers or electronic distributors. This staff cannot believe that Sanyo would try to eliminate the large mail order dealers who do provide support to the customers and provide over 80% of Sanyo's business.

Compaq Introduces 286 Desktop and Portable Models

Compaq the second most successful MSDOS computer manufacturer has introduced new models designed to compete with the IBM AT. The Compaq 286 computers work with all the popular software applications programs, hardware peripherals and add-ons available for the IBM-AT without modification. They also provide more memory and data storage capacity and faster processing speeds than the IBM system. The 286 uses the 80286 CPU running at 8MHz with the ability to run the slower 6MHz speed of the IBM PC. A choice of 20, 30, or 70 Mbyte hard disk is available and up to 8.3 Mbyte of RAM is supported. The Compaq Deskpro 286 Model 1 includes a 1.2 Mbyte floppy, 256K RAM and cost $4,499 with monitor. The Model 2 adds the 30 MByte hard disk and has 512K Bytes of RAM and is $6,254 with a color monitor. There is also a portable version in both the Model 1 and Model 2 configurations. The Model 1 portable is $4,449 while the Model 2 portable is $6,299. ●

Figure 4
Compaq 286 Computers

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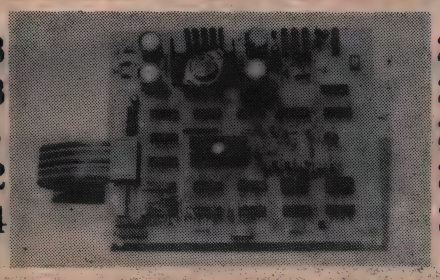

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A Zero Cost Print Spooler For Basic Programs

by Jack Ganssle

WAIT — OUTPUT BEING SENT TO PRINTER. How much time have you spent waiting for your Basic program to print? At 1200 baud even a short printout can take an annoying amount of time. Your micro is a sophisticated computer system. Shouldn't the computer wait for *you*?

The easiest way to eliminate the wait is to connect a print spooler between your computer and the printer. However, print spoolers typically cost from $200 to $500, depending on features and buffer size.

This article describes a technique of spooling output from a Basic program using only software. No expensive hardware is required. Of course, this technique involves some tradeoffs. The "buffer size" in a software print spooler is limited by the amount of available memory, so large printouts may still cause the system to wait for the printer.

Spooling is the process of sending output to some intermediate device before transmitting it to it's ultimate destination (in this case, the printer). Spool is actually an acronym for Simultaneous Peripheral Operation On Line. In large systems output is invariably spooled to a disk device before being sent to the printer. This is a marvelous solution, since a mainframe generally has hundreds of megabytes of fast disk. It doesn't work too well on a floppy disk system. For example, the IBM PC comes with a floppy disk spooler (PRINT) — it's spooling mode is so slow as to be almost useless.

In a traditional Basic spooling can be done only by writing a spool routine which is called via GOSUB every few lines in the main program. This is rather awkward since many hundreds of calls may be needed. The basic idea is to write the output into an array or string variable, and then, on each call to the spool routine, test the printer to see if it's ready for a character; if so, one is sent from the buffer.

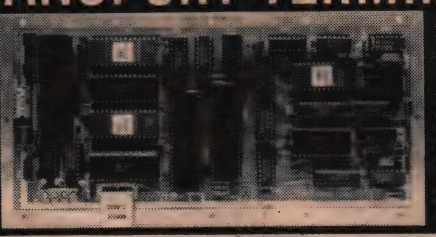
What we really need is some way of performing multiple chores (tasks) simultaneously on one computer. One task would be the main program that generates the output to send to the printer. It would place the output in a buffer. Another task would then constantly test the printer and send

Continued on page 148

```
10   INTEGER START,SIZE,END,PBUF(1000)
20   INTEGER I,J
30   STRING A$(90),C$
40   WSELECT 1
50   WINDOW 10,1,20,10
60   ERASE
100  GOSUB 3000: ! Initialize pointers
110  RUN 1,1: ! Start the spool task going
120  WFRAME "_","|"
130  WINDOW 11,2,19,9
240   A$="ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789"
250   A$=CONCAT$(A$,CHR$(13))
260   A$=CONCAT$(A$,CHR$(10))
300  PRINT "Ready"
310  INPUT C$
320  GOSUB 2000
330  GOTO 300
1000 !
1010 !  Spooling Routine. This task empties the buffer (PBUF) to
1020 ! the printer.
1030 !
1040 TASK 1
1041 WSELECT 2
1042 WINDOW 1,1,4,50
1043 WFRAME "_","|"
1044 WINDOW 2,2,3,49
1050 FILE  - 1
1060  IF  END = START THEN  WAIT 100: GOTO 1060
1070 PRINT CHR$(PBUF(START));
1080 FILE 0
1090 PRINT CHR$(PBUF(START));
1100  START=START + 1
1120  IF  PBUF(START) = 10 THEN  WCLEAR
1125  IF  START > SIZE THEN   START=1
1130 GOTO 1050
2000 !
2010 ! This routine appends the contents of A$ to the output buffer.
2020 !
2030  J=END
2040 FOR I=1 TO LEN(A$)
2050  J=J + 1
2060  IF  J = START THEN  GOTO 2060
2070  PBUF(J - 1)=ASC(MID$(A$,I,1))
2080  IF  J = SIZE THEN   J=0
2090 NEXT I
2100  IF  J = 0 THEN   J=1
2110  END=J
2120 RETURN
3000 !
3010 ! Initialize pointers.
3020 !
3030  START=1
3040  END=1
3050  SIZE=990
3060 RETURN
END
```

Listing #1

ANSI CRT TERMINAL BOARD



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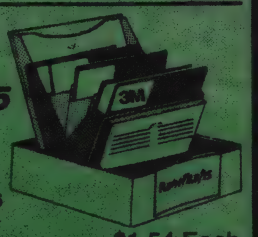

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Continued from page 147

characters as they become ready. Each task would be almost a separate program running independently of the other, sharing only the output buffer.

The process of performing several tasks at the same time is called multitasking and is commonly used on minis and mainframes to service many users and devices. Since a single computer can run only one activity at any specific instant the processor actually switches between each task many times a second. It will run one task for a few milliseconds, then another, and will eventually resume with the first task. The computer is so fast that each task thinks it is in sole control of the machine. Once each task is started, the control software performs all of the context switching (the changing of execution from task to task) automatically.

```
LD      HL,INTERM     ; Save address of intermediate buf
LD      E,(HL)        ; Get character count
INC     HL
LD      D,(HL)        ; DE = character count
INC     DE            ; Increment char count
LD      (HL),D        ; Restore new count
DEC     HL
LD      (HL),E
ADD     HL,DE         ; Point to next spot  in buffer
LD      (HL),A        ; Save Character
RET
```

POKE ROUTINE

MTBASIC, a $49.95 Basic compiler sold by Softaid (address at end of this article) supports multitasking as described above. Most Basic compilers are tedious to use, since the program must be compiled, linked and loaded, a process which takes many minutes. MTBASIC acts rather like an interpreter — the program is entered with line numbers and compiled via RUN.MTBASIC interacts with the programmer in a manner very similar to Turbo-Pascal from Borland International.

Since MTBASIC supports multitasking, a program written in it can also have a zero-cost print spooler. Only one of the up to 10 tasks MTBASIC can run concurrently (i.e., at the same apparent time) need be dedicated to spooling.

Listing 1 is an example program using task 1 as a print spooler. MTBASIC also supports windowing (under CP/M or MS-DOS), so in this example windows are used to graphically demonstrate the spooling action. Window 2 shows the data being sent to the printer.

Window and task control statements appear in the program. These are:

TASK — Designates the start of a task. In this example, lines 1000 to 1130 constitutes task 1.

RUN — Starts the execution of a task. Line 110 starts task 1 running.

WAIT — Causes an activity to delay for a short period.

WSELECT — Selects which of up to 10 windows is to be used by a particular task. The selection pertains to a task, so in this program all output from task 1 will go to window 2. Similarly, all output from the main program will go to window 1.

WCLEAR — Erase the currently defined window (not the whole screen).

WINDOW — Defines the

Continued on page 150

```
10   INTEGER START,SIZE,END,PBUF(1000)
20   INTEGER I,J,ASM(15),INTERM(500)
30   STRING A$(90),C$
40   WSELECT 1
50   WINDOW 10,1,20,10
60   ERASE
100   GOSUB 3000: ! Initialize pointers
105   GOSUB 4000: ! Load drivers
110   RUN 1,100: ! Start the spool task going
115   RUN 2,100: ! Start the task to move buffers
120   WFRAME "_","|"
130   WINDOW 11,2,19,9
240    A$="ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789"
300   PRINT "Ready"
310   INPUT C$
320   FILE 4
330   PRINT A$
340   FILE 0
350   GOTO 300
1000  !
1010  !  Spooling Routine. This task empties the buffer (PBUF) to
1020  ! the printer.
1030  !
1040  TASK 1
1041  WSELECT 2
1042  WINDOW 1,1,4,50
1043  WFRAME "_","|"
1044  WINDOW 2,2,3,49
1050  FILE  - 1
1060   IF  END = START THEN  WAIT 100: GOTO 1060
1070  PRINT CHR$(PBUF(START));
1080  FILE 0
1090  PRINT CHR$(PBUF(START));
1100   START=START + 1
1120   IF  PBUF(START) = 10 THEN  WCLEAR
1125   IF  START > SIZE THEN   START=1
1130  GOTO 1050
2000  !
2010  ! Copy INTERM to PBUF
2020  !
2025  TASK 2
2030   IF  INTERM(1) < 30 THEN  WAIT 100: GOTO 2030
2035   J=END
2040  INTOFF
2050  FOR I=1 TO INTERM(1) - 2
2060   J=J + 1
2080   PBUF(J - 1)=PEEK(ADR(INTERM(2)) + I)
2090   IF  J = SIZE THEN   J=0
2100  NEXT I
2110   IF  J = 0 THEN   J=1
2120   END=J
2125   INTERM(1)=2
2130  INTON
2140  EXIT
3000  !
3010  ! Initialize pointers.
3020  !
3030   START=1
3040   END=1
3050   SIZE=990
3060  RETURN
4000  !
4010  ! Load assembly language drivers
4020  !
4100  DATA $21,0,0,$5E,$23,$56,$13,$72,$28
4110  DATA $73,$19,$77,$C9
4120  FOR I=ADR(ASM(1)) TO ADR(ASM(1)) + 12
4130  READ J
4140  POKE I,J
4160  NEXT I
4170   I=ADR(ASM(1)) + 1
4180  POKE I,ADR(INTERM(1))
4190   I=ADR(ASM(1)) + 2
4200  POKE I,BAND(ADR(INTERM(1)),$FF00) / 256
4220  POKE $107,ADR(ASM(1))
4230  POKE $108,BAND(ADR(ASM(1)),$FF00) / 256
4240   INTERM(1)=2
4259  RETURN
END
```

Listing #2

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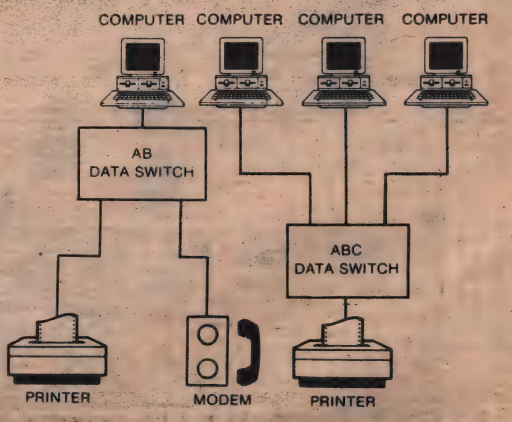

Zero Cost Print
Continued from page 148

boundaries of the window selected by WSELECT. The arguments are the window's upper left hand corner row and column, and the lower right hand corner row and column.

WFRAME — Draws. an outline around a window using the characters given as arguments.

FILE — Selects destination of output. FILE 0 selects the CRT (in the current window). FILE-1 selects the printer.

Lines 10 to 330 comprise the main program. This example just spools (prints) the A$ string whenever a carriage return is pressed. Of course, your application would hopefully perform some useful function here.

The main task starts by defining a window to keep its output from running into the window in task 1. The spooling task is started by a RUN statement. The RUN is not like a GOSUB (which stops the current execution during the subroutine). Rather, RUN starts task 1 going, allowing task 1 to share the processor's time with the main program.

A$ is set to a longish string to make spooling meaningful. A carriage return and line feed (13 and 10) are concatenated to A$ to make the printer use separate lines.

The main task displays "Ready" in window 1 whenever the operator may enter a return to send another line to the printer. Note that if the buffer fills up, the program will wait till it begins to empty.

The subroutine at line 2000 is called when a return is detected. This subroutine simulates a PRINT statement to a line printer, except that it writes the output to the print spooling buffer (PBUF). Task 1 will actually send the buffer to the printer. START and END are used as pointers. START is the location of where the spooler must extract data from to send it out. END is the location of where data may be inserted into the buffer. When START or END reaches the end of PBUF (specified by SIZE), they are both reset to the buffer's beginning. This data structure is known as a "circular buffer" since it really has no end or beginning. Data appears to rotate through it.

If END = START, then the buffer is either full or empty. Line 2060 stops the main program from appending more data to the buffer if it becomes full. Line 2060 looks odd in the context of a conventional Basic program; in normal Basic, if J = START, then J will *always* equal START since the line loops to itself. In a multitasking environment, however, another task (task 1 in this example) may alter the value of a variable. Task 1 advances START as it extracts characters from the buffer.

Lines 1000 to 1130 comprise task 1, which is the print spooler itself. It assumes that PBUF is a circular buffer containing the output string, with START and END defined as above.

Task 1, for demonstration purposes, puts the characters in a window on the CRT as they are being sent to the printer. The user can thus actually see the spooling process. Of course, the windowing is not needed for an actual application.

The spooling is almost trivial. If START = END, then the buffer is empty, so task 1 idles by going into a WAIT state. As the subroutine at 2000 adds characters to the buffer, task 1 extracts them at START, sends them to the printer (at 1070), and also to the CRT (1080 and 1090). START is then advanced. Line 1120 erases the window (WCLEAR) whenever a line feed is sent.

PBUF is the spooling buffer, and SIZE (line 3050) defines its maximum length. This can be increased to allow spooling of more data, thus reducing printer waiting even more.

A More Sophisticated Example

While this program works well, it is somewhat tedious to format output into string A$. A much easier solution would

Continued on page 151

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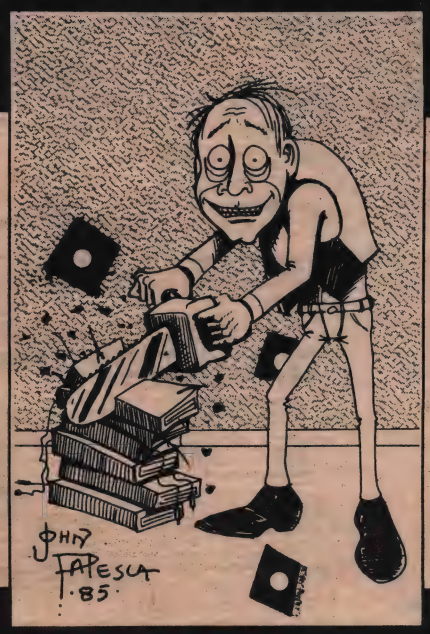

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Zero Cost Print
Continued from page 150

be to actually issue PRINT statements, and somehow redirect their output to the buffer.

As we saw in the previous example, the FILE statement directs output from a PRINT statement to various devices. FILE 4 designates the first of 3 possible user-configured I/O devices. MTBASIC doesn't know the interface protocol to user devices, so it provides a link at address 107H. The user must patch the address of a device handler here.

This facility is exactly what we need. Listing 2 shows a print spooler much like the previous example, except that output is now sent to the spooler by setting FILE 4, and then simply using normal PRINT statements. Note that Task 1, the spooler, is identical to then one in listing 1. Lines 4000-4250 load a Z-80 assembly routine to put the output from the print statements into an intermediate buffer (INTERM), and set the link at 107H to point to the routine. Another task, task 2, is added to copy the intermediate buffer to PBUF, the actual spooling buffer. This could be done in the assembly routine, but would increase the complexity of the assembly code.

The assembly routine is POKEd into array ASM. The code loaded is shown on page 148.

In both of the above listings, MTBASIC must be made aware of the multitasking environment by issuing the direct command TICS ON, which simulates a source of interrupts.

Summary

We've seen that spooling can be implemented easily by using the computer's really phenomenal speed to perform more than one activity at a time. Although MTBASIC was used to provide the multitasking capabilities needed, an assembly language multitasking driver could have been written to implement a similar function. A source of interrupts would be required, and the software would be rather complex. Advocates of 16 bit computers would have you believe that 8 bits is inadequate for multitasking; this simply isn't true.

MTBASIC is available from SOFTAID, Inc., P.O. Box 2412, Columbia, MD 21045. Softaid's phone number is (301) 792-8096.

The author can be reached on Compuserve under user ID 76012,1457. ●

The Privacy Game

by L.J. Kutten

Big Brother is watching you and me. Slowly and inexorably government and private industry is building a data base on everything we do. Among the data contained is where we live, how much we earn, what magazines we read, what charities we support, what medical problems we have, whether we drink or use controlled substances, how we spend our money, etc. No bit of data, no matter how seemingly insignificant, is overlooked.

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Continued on page 152

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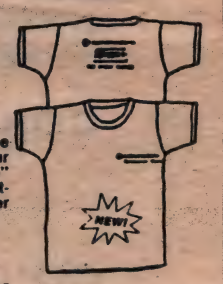

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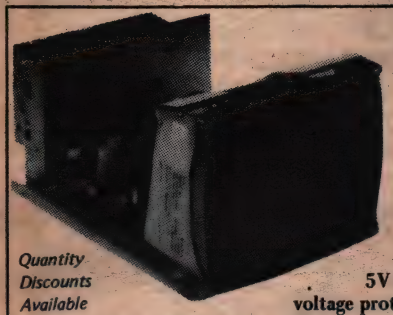

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The Privacy Game
Continued from page 151

amounts of data. Before the computer, the sheer amount of paperwork kept us private. For generations, government and private industry has been keeping credit records, tax records, military records, and the like in paper form. It was either impossible to get to them (e.g. the U.S. Armed Forces stores all military personnel records in St. Louis) or prohibitly expensive (imagine the cost of manually searching through 10 million records). With the computer, comparison and retrieval of these records is possible and relatively inexpensive.

Besides analyzing and providing raw data, the computer gives those in power the ability to control our movements. Consider the effects of a fully integrated electronic funds transfer for consumer transactions. It is "sold" to the public as a means of instantaneously paying our bills. There will be no need for checks or other currency. What is not stated is that it also provides a way of tracking an individual's movement through society. The bank or any other interested party can know where you are at almost any moment.

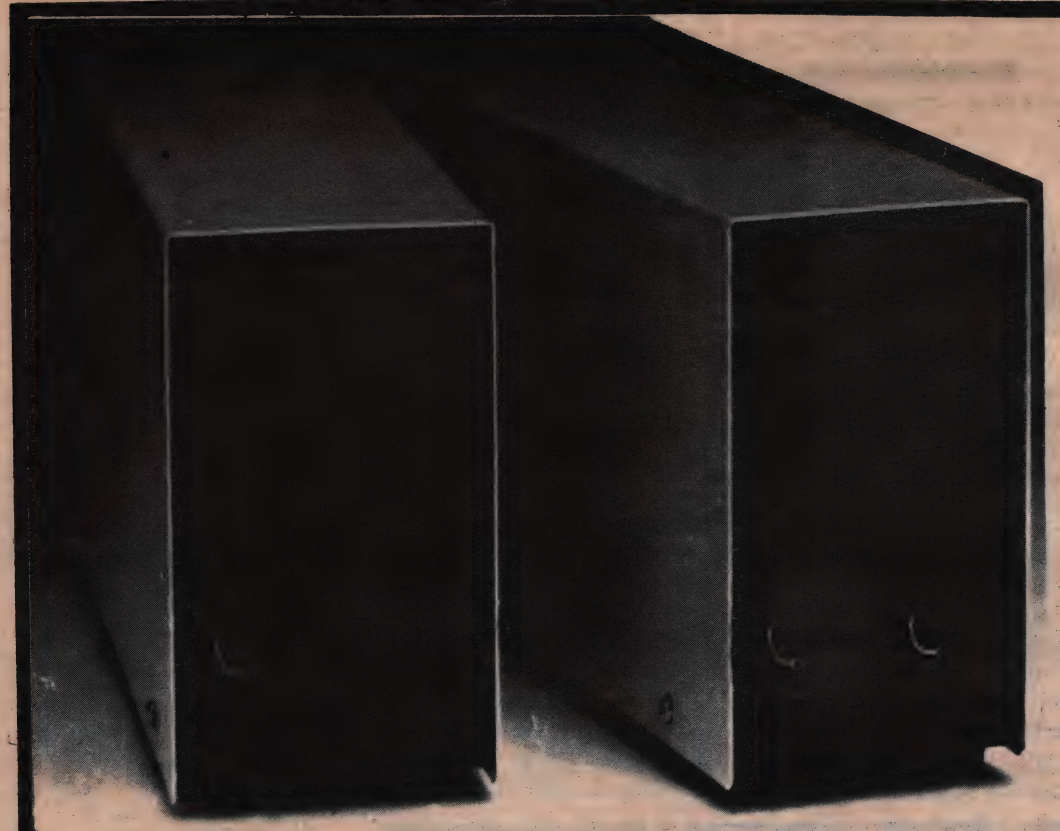
Before Big Brother can do its work, it has to (1) accumulate the data, and (2) process it. This is what this article is all about. It will (1) examine the law regarding the computerized interception of data and messages, and (2) some legal considerations of collection and manipulation of data.

Interception of Data

Some History: It is only during the past 20 years that the right to privacy has been promoted. There is no mention of the right to privacy in the Bill of Rights or the U.S. Constitution. Perhaps the Founding Fathers felt they had nothing to fear. There were no telephones, mass media, or data banks. They would have been unable to conceive of a government that was interested in everything its citizenry did. But their world was not totally private. Even then people wanted to eavesdrop on "private" messages. Of course, back then, there was one important limitation on this desire. The ability to intercept and listen to a message was either limited by the ability to monitor the conversation or get actual possession of the written communication.

This changed with the development of the telephone and other electronic methods

Continued on page 154



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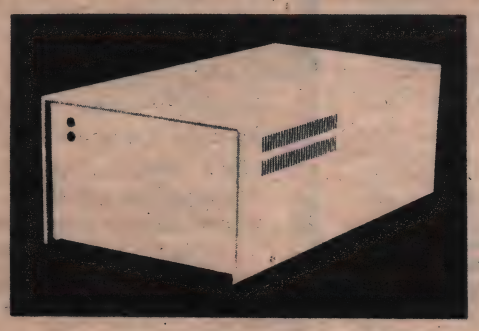

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The Privacy Game
Continued from page 152

of communications. The physical limitation disappeared. You could be miles away and still be able to monitor a conversation. Of course, it was still difficult. You still had to place a listening device. To eavesdrop on a conversation between two people standing next to each other you had to place a monitoring device. With telephone conversations it was easier. All you had to do was tap the line. The tap could be anywhere in the telephone system.

The fact that some people felt it violated their rights was inconsequential. In **Olmstead v. United States**, 277 U.S. 438 (1928), the United States Supreme Court ruled it was perfectly legal for the government to monitor a telephone message so long as there was no trepassing on the defendant's property to make the interception.

It was not until 1968, that this case was explicitly overruled by the Wiretap Act. Then Congress passed a law that made it illegal (with certain exceptions) to willfully intercept the oral communications of any person by use of any electrical or mechanical device (See 18 U.S.C. §§ 2510-2520).

The limitation of the ACT to oral communications has had important consequences. Any conversation which is not oral communication is not protected and the rule of **Olmstead** still applies. Thus it is perfectly legal for the police to attach a pin register (a device that only records the number called) on your phone without a warrant.

You ask, how is this important to me! Well, computers do not talk in "oral communications." They talk in digital bits. Since they talk in digital bits, any interception of them is not a violation of the law. It does not matter if you are talking to your Aunt Matilda in Spokane (i.e. the telephone company converts your oral conversation into digital bits for internal processing) or it is one computer transferring information to another computer. So long as only digital bits are involved, they can legally be tapped.

This is one of the reasons the FBI and private industry has trouble prosecuting computer hackers who break into private data bases and examine confidential files (e.g. the 414 group out of Milwaukee who broke into the Los Alamos data base and the Sloan Kettering Medical Center). Unless they damage a file or the system, or break some other explicit law, there is no way under Federal law to prosecute them.

The Implications: The effect of this gap in the law on society as a whole can be devastating. Consider the effect of any of the following tapping or interception digital transmissions on a business:

1. An oil company wanting to see the test results of another company's exploration;
2. A parts supplier who wants to be sure to underbid a competitor in a competitive bid;
3. An industrial spy seeking a competitor's "secret formulae"; or
4. A foreign power who wants to intercept digital information being transmitted by businesses and government agencies.

This gap can also have a large effect on individuals who use home banking and telecommunication services like the Source or Compuserve:

1. **Electronic mail:** With traditional mail, the most the Post Office or any other interested party can tell (without opening the letter) is what you receive (there are very strict laws regarding the opening of first class mail). With electronic mail, not only is the content available, but who sent it is also known. This information gives the eavesdropper the ability to determine relationships among people. Say this cannot happen. Well earlier this year a Federal grand jury attempted to subpoena electronic mail and files of a cocaine distribution ring that allegedly used The Source online service to communicate with each other. The Government claimed that since these materials were not regular mail, they did not have the same privacy protection as regular mail. A battle was only avoided when one of the parties pled guilty.
2. **Medical Treatment:** You need a kidney donor who fulfills certain medical requirements. The hospital states they have discovered such an individual but that he refuses to help. You ask for his name and address so you can make a "personal" appeal. The hospital refuses so you examine its data files to locate the person's name and address. Perhaps that person will "suddenly" have a serious accident and die, thus freeing his kidney for you to use.
3. **Sales:** A company has developed a new computer product for the Apple Macintosh computer. It downloads from Compuserve, the name and address of every user who has Apple equipment. It then sends junk mail, E mail, to every such person. As you are billed for your actual use, it will cost you to examine and get rid of the junk mail, E mail.
4. **Home Banking:** With home banking, someone can access your account from a remote location and pursue your account and payment history. How much you pay and to whom. Among people to whom this information would be useful are (1) companies that compile credit reports; (2) a stock broker trying to pre-

Continued on page 159

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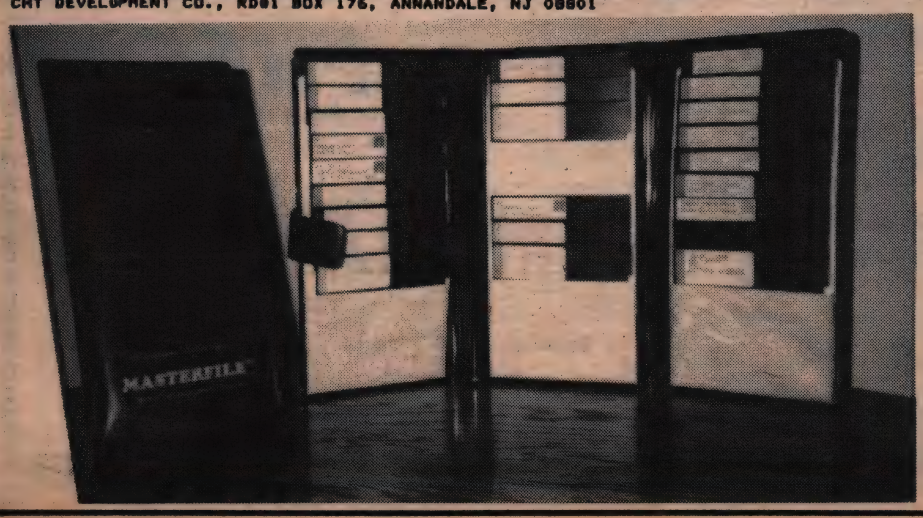

PROMAL
Continued from page 144

line into memory, and call a special routine from the library to convert the input into a numeric representation. The key is a routine named STRVAL for input, and another named OUTPUT to print results to the screen. Before we had finished, we were glad to have BASIC for this sort of thing. We concluded that PROMAL was great for long, complicated programs, but give us BASIC for simple, short stuff!

PROMAL Strengths and Weaknesses

PROMAL is a powerful and versatile system which provides all the tools necessary to program complex activities taking advantage of the best features of the Commodore 64 - color, graphics, sprites, and music. Several of the demonstration programs gave impressive testimony to the speed of execution and the relative clarity of the program technique to achieve these "mysteries." Anyone who has tried to move sprites around using BASIC can appreciate what such power means. However, PROMAL compromises in several important areas where Commodore machines are most likely to be used, so carefully evaluate the purpose for which the system will be used. As this language gains popularity (and we think it will), many of the shortcomings will be overcome

Continued on page 156

FastLoad
Continued from page 115

tion, I'll warn you here that when you make a copy of a disk you must not have a printer interface hitched up to the disk drive. If you use a Commodore printer you won't have any problems, but Cardco, Tymac and other printer interfaces interfere with the copy routines.

Although it's only a minor inconvenience, unless you're aware of it in advance, you'll think there's something wrong with the cartridge. I checked mine out at K Mart to be sure it was working properly before calling Epyx to complain. The technician there was very polite and tried to be helpful. Once I explained the problem, he knew exactly what was wrong. Epyx claims the next version of the documentation will warn about the incompatibility.

For advanced programmers, Fast Load also includes an assembly language monitor. The instructions for SMON as it is called are quite thorough with many examples. Too bad all the documentation wasn't this well written.

Mach 5 Extras

Mach 5 includes an option to disable the disk drive rattle. While saving wear and tear on your drives, this may not be usable with some commercially marketed programs.

Another nice feature of Mach 5 is the printer dump command. Unless a program disables Mach 5 when it is loaded (and most do), you can use a two key combination to list whatever is on the screen to your printer. This is handy when you would like a copy of a disk directory or a program listing. The hard copy function won't work from inside another program. You can't be running a game and print out the hi res screen graphic, but from the ready prompt it works fine.

Unlike Fast Load, Mach 5 comes with a disk. The two programs on the disk are an improved version of BASIC that gives you an extra 4K of programming space and a disk catalog program.

When the BASIC + 4 program is loaded it automatically disconnects Mach 5. A simple SYS command will bring it back. BASIC + 4 doesn't work with most commercial programs because of memory problems, but it isn't really intended to be used that way. When programs get too big for the Commodore's memory to handle, the extra 4K may be just what you need to get in those last few extra lines.

The disk organizer is the real bargain of the set though. Using one or two drives, it reads in the directories off your disks and then sorts them into a neat and tidy listing that can be sent out to the printer or viewed on the screen. You can also print out a listing of all the PRG, SEQ or other files. You can search through the filename database for a particular file to check which disk it is on or if you can't remember the filename exactly, search using wildcards.

You can also print a listing of the disks you have cataloged. This list will tell you how much space is left on each disk, as well. You can printout the directories, either individually or as a group. This is a great way to be sure which files are on which disks.

If a disk becomes obsolete, it can be deleted by entering its diskname after choosing the "Delete a disk"option. The program even formats the catalog disk for you before you start. In addition to all this, the

Continued on page 158

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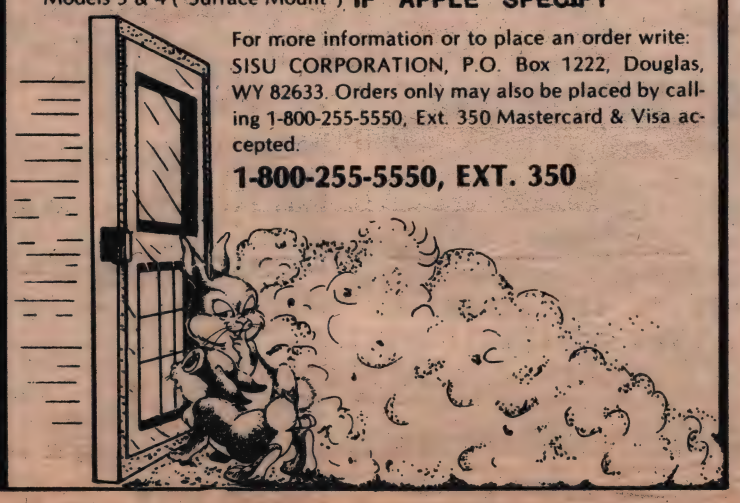

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PROMAL
Continued from page 155

by users and by the inventor. Already there are several public domain downloads available from CompuServe by entering the CBM programming SIG and BROwsing the "Beyond BASIC" section. These include user impressions, disk utilities, and machine language interfaces for use with the PROMAL system.

We can summarize our impressions after this first program development experience with PROMAL as follows:

Strengths:

* Use of PROCEDURES and FUNCTIONS is a definite advantage, especially since you can copy them into other programs once they are developed.
*Sprite and graphics controls are a breeze.
*Machine language routines may be called directly within a PROMAL program.
*Speed of execution is very, very fast, approaching that of machine language.
*INCLUDE LIBRARY permits a powerful resource of routines and commands to be built up and entered into any PROMAL program in with a single command.
*Resident memory workspace speeds use of the Editor and Compiler significantly.
*Single keystroke entries take the drudgery out of file maintenance.
*Automatic error detection and identification are performed by the Compiler, allowing prompted return to the Editor for repair.
*Recursion, indented formats, and English language key words make program structures powerful and clear.

Weaknesses:

*Numeric input requires special manipulations and awkward definition.
*Editor defaults are more troublesome than need be for ALPHALOCK and within line insert/delete.
*Device designations do not include modems requiring the User Port, and no Machine language program is included to do that.
*Dual Commodore 1541 disk drives are not supported, but those using addresses 0 and 1 are.
*Compile time is somewhat slower than PASCAL, but this is not a serious weakness.
*Syntax requirements for conditional operations are not obvious and examples do not cover all needed activities.
*Indentation is not automatic but does control how the system compiles and runs routines. Hidden bugs can be difficult for beginners to find.
*Errors can cause the system to "crash and burn," locking up the keyboard and blitzing the screen when a program improperly constructed is compiled and run.

Summary Rating

Based on a subjective evaluation system, this program development system scores 85 out of a possible 100, as follows:

1. Performs as Advertised - 17
2. Quality of Documentation - 17
3. Ease of Learning - 14
4. Ease of Use - 17
5. Cost for Value Received - 20

This score might be lower if it were not for the very reasonable price and high quality of workmanship put into this package. PROMAL is tough to use for the novice and tends to "trap" the user who is unaware of its peculiarities. However, when a programmer becomes comfortable with the language requirements and syntax, this programming system is probably the most powerful around for the Commodore. We agree with the claim made by SMA that the system is "elegant" and are glad we had an opportunity to try it out. Given the "Try before Buy" approach, this system is an excellent value. It is also available for the Apple IIc, IIe, and the IBM PC and PCjr! BYE.

PROMAL Demonstration System - $10.00
PROMAL End User System - $49.95
PROMAL Developer's System - $99.95

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Dept. MP-1
Raleigh, NC 27609
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```
5 PRINTCHR$(147)
6 DIM B(100)
10 INPUT" HOW MANY NUMBERS";X
20 FORA=1TOX
30 PRINT:PRINT" ENTER VALUE";A;:INPUT B(A)
40 NEXT
50 SU=0
60 FORA=1TOX
70 SU=SU+B(A)
80 NEXT
90 PRINT:PRINT:PRINT" AVERAGE =";SU/X
```

#1 Commodore Basic Example

```
10 REM CLEAR SCREEN
15 DIM B(100)
20 INPUT "HOW MANY NUMBERS :";X
25 FOR A= 1 TO X
30 PRINT"ENTER VALUE # ";A;:INPUT B(A)
40 NEXT
50 SU=0
60 FOR A = 1 TO X
70 SU=SU+B(A)
80 NEXT
90 PRINT:PRINT"AVERAGE = "; SU/X
```

#2 MBASIC Example

```
PROGRAM AVERAGE;

VAR X:INTEGER;
    B,SU:REAL;

PROCEDURE HOWMANYNUMBERS;

BEGIN
  WRITE('HOW MANY NUMBERS :');
  READ(X);
END;

PROCEDURE GETNUMBERS;

BEGIN
  FOR A:=1 TO X DO BEGIN
    WRITELN;
    WRITE('ENTER VALUE # ',A,': ');
    READ(B(A));
  END;
END;

PROCEDURE CALCULATE;

BEGIN
  SU:=0;
  FOR A:= 1 TO X DO BEGIN
    SU:=SU+B;
  END;
END;

PROCEDURE PRINTRESULTS;

BEGIN
  WRITELN;
  WRITE('AVERAGE = ',SU/X);
END;

(*MAIN PROGRAM*)

BEGIN
  CLRSCR;
  HOWMANYNUMBERS;
  GETNUMBERS;
  CALCULATE;
  PRINTRESULTS;
END.
```

#3 PASCAL Example

```
PROGRAM AVERAGE ;program name

INCLUDE LIBRARY ;calls predefined
                ;routines into use.
BYTE BUF [81] ;variables of type byte,
BYTE INDEX    ;word, and real.
WORD X        ;[ ] indicates and array.
WORD A
REAL SU
WORD B [100]
REAL TOT

PROC HOWMANYNUMBERS ;procedure to set
                    ;start parameters.
BEGIN
PUT "HOW MANY NUMBERS :"
GETL BUF
INDEX=STRVAL(BUF,#X)
END

PROC GETNUMBERS ;procedure to get input

BEGIN
FOR A=1 TO X
  PUT CR
  OUTPUT "ENTER VALUE NUMBER #W", A
  PUT": "
  GETL BUF
  INDEX=STRVAL(BUF,#B[A])
END

PROC CALCULATE ;procedure to do math.

BEGIN
SU=0
FOR A=1 TO X
  SU=SU+B[A]
TOT=SU/X
END

PROC PRINTRESULTS ;procedure to output
                  ;results.
BEGIN
PUT CR
OUTPUT "AVERAGE = #R", TOT
END

BEGIN ;main program (uses all others in
PUT $0C ;           this application).
HOWMANYNUMBERS
GETNUMBERS
CALCULATE
PRINTRESULTS
END
```

#4 PROMAL Example

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Table 1 **Comparative Load Times**

Program Name	Normal Load	FastLoad	Mach 5
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Print Shop	1:10	:28	:32
Micro Illustrator	1:08	:42	:42
Spritemaster	1:09	:19	:20
Flight Simulator II	2:50	1:23	1:02
Pogo Joe	2:09	:18	:21
Pinball Construction Set	2:15	1:20	1:24
Bank Street Writer	1:22	:41	:45
David's Midnight Magic	1:54	:43	:42
Music Construction Set	2:50	2:42	2:42
Homeword	3:03	3:03	3:03
50 Mission Crush	:30/1:36	:21/:23	:21/:23
Muppet Learning Keys	2:14	2:14	2:14
Beach-Head	2:10	:41	:42
Neutral Zone	1:35	:32	:32
Murder By The Dozen	1:19	:44	:50
Many Ways To Say I Love You	1:54	:29	NL
Barbie	:15	.15	:15

Software Load Times For FastLoad & Mach 5

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Command mode allows any editor command to be executed by name. It is much easier to remember a command name versus a complicated key sequence. Command mode makes it easy to master the full capability of the editor. Frequently used commands can be mapped to keys. Infrequent commands can be executed by name.

Editor Commands

The editor contains more than 100 commands. With so many commands, you might think it would be difficult to use. Not so, it is actually extremely simple to use. With command mode, the power is there if you need it, but it doesn't get in your way if you don't. Following is a list of some of the commands.

Cursor Commands

Left/Right/Up/Down
Tab Right/Tab Left
Forward Word/Backward Word
Beginning of Line/End of Line
Scroll Up/Scroll Down
Window Up/Window Down
Scroll Left/Scroll Right
Top of File/Bottom of File
• • •

Block Commands

Copy/Move/Delete
Read/Write
Lower Case/Upper Case
Fill/Justify
Print

File Commands

Directory (with wild cards)
Show File/Help File
Input/Output File
Delete File/Save File

Other Commands

Split Screen/Other Window
Find String/Replace String
Replace Global/Query Replace
Delete Line/Undelete Line
Delete Word/Undelete Word
Insert Mode/Overwrite Mode
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CS

FastLoad

Continued from page 155

regular file commands are still available so you can delete files or check disk directories before cataloging the disks.

Probably the most important feature of the program is its change the diskname option. Since all disks must have a unique filename, using the catalog program would be very difficult for people who have duplicate disknames. Do you know how to change a diskname without wiping out all the files on the disk? I sure don't.

Using this package will really help you get your files in order. If you have two drives, it becomes easy to transfer similar files to the same disk or to get rid of old files you don't need. You can even use the disk rename function to give more relevance to your disk filing system. (See illustration 1 for a sample of the disk and catalog listings.) The decision whether to buy Fast Load or Mach 5 is up to the user. Although there are disk based quick load programs available, I'm partial to cartridges because they automatically engage when the machine is turned on. It seems silly to me to have to load in a program using the normal slow loading process in order to load in other programs faster.

Both programs operate in much the same manner at about the same speeds. The main differences come in when you look at the add-ons. You'll have to decide whether getting a machine language monitor and a disk copy routine are more important than getting the extra 4K of BASIC and the catalog program. If you already have a copy program, the catalog offered by Mach 5 might make it the better deal. If you already have a catalog program, maybe you need Fast Load's assembly language monitor.

Since both cost about the same amount of money, the choice may be very difficult. For me, having both means the flexibility to use whichever suits my immediate needs. ●

Fast Load
Epyx
1043 Kiel Court
Sunnyvale, CA 94089
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Mach 5
Access Software
925 East 900 South
Salt Lake City, UT 84105
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The Privacy Game
Continued from page 154

qualify individuals for sales pitches; or (3) your spouse's divorce attorney who is trying to prove that you really earn more money than you claim.

Proposed Changes

Because of the weakness in Federal law many states have passed statutes that make it illegal to access a computer or tap a line without permission. For example, Arizona makes it illegal to access, change, damage, or destroy any computer, computer file, computer system, or computer network, without permission. Other states with similar laws are California, Colorado, Missouri, New Mexico, North Carolina, Ohio, Rhode Island, Utah, Virginia, Wisconsin.

There is one major weakness with state laws, namely determining where the crime took place. It is one thing to get an Arizona prosecutor to prosecute an Arizona resident, who unlawfully accessed an Arizona based computer. It is quite another thing to get the same prosecutor to prosecute a Maine resident (or any other state than Arizona) who never left his state and accessed the Arizona computer using a communication network such as Tymnet or Telenet.

Federal legislation may be the answer. Representative Robert Kastenmeier (D-Wis.) has proposed that Congress form a special select commission to consider ways to ensure the privacy of communications in the computer age. Likewise, both the House and Senate Judiciary Committees will hold hearings on ways to modify the 1968 Wiretap Act to cover computer data transmissions.

Privacy And Videotext

In the next few years, tens of millions of Americans will use their home computers and videotext systems to do their banking, send messages, buy goods, scan databases, and the like all without having to leave the comfort and safety of their own homes.

These Americans will think to themselves how wonderful videotext is. What they do not realize is that videotext has a built in Pandora's Box of data accumulation. Everything they do on the videotext system can be recorded by the provider of the service and used for other purposes.

There is nothing in the law to prevent Compuserve or any supplier of videotext information from compiling data files on how each of its users use the system. The suppliers of videotext information attempt to calm their users' fears by stating theirs is an implied right of privacy. Any information that is compiled will be used for internal use only and will not be released to third parties. What is not stated is that the videotext supplier must release this information upon a proper court order.

This has already happened in the cable television field. An Ohio prosecutor decided to prosecute an adult movie theatre for showing "obscene movies." Warner Amex's QUBE had shown one of the

Continued on page 160

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The Privacy Game
Continued from page 159

same movies on its local R-rated movie channel. The movie theatre attempted to subpoena the records of those customers who had watched the movie over QUBE in an attempt to establish the "community standard of decency."

QUBE did not care what its users watched. It kept the records for billing purposes. However, since the records existed, they were discoverable. Luckily for the users, the court ruled QUBE did not have to provide the identities of its viewers (which exceeded the number who had watched the movie at the theatre). It did have to provide the aggregate viewer statistics. Had the court required the names, QUBE would have had to supply them. They could have become part of the trial's public record.

This is just one example. The mind boggles at the number of records that can be compiled and the different ways they can be used. Just because the records are kept does not mean there is a bad intent. One of the major problems bedeviling the computer revolution is the inability to anticipate future uses of information. Telecommunication and computer systems evolve on the basis of immediate need with little consideration as to the long range consequences.

How The Videotext Industry Is Responding To This Problem

Because of these problems, the Videotext Industry Association has published a set of "Model Privacy Guidelines for Videotext Systems."

Under these guidelines the system operator may compile and use bulk information (i.e. aggregate records that do not identify individual users) in any manner it wants and disclose the information to others (i.e. they can sell it.)

Any individual information may be collected to (1) provide service to a user's request, (2) maintain technical information, (3) prevent illegal or unauthorized use of the system, (4) manage the billing and accounting systems, and (5) conduct market research. The system operator is prohibited from using or disclosing the information for any purposes without the written or electronic permission of the subscriber giving the subscriber the right to refuse disclosure (except in the case of compulsory government access).

When the system operator seeks this permission it must specify the type of information to be disclosed and the purpose. The system operator further agrees not to exclude any subscriber from any videotext who declines to provide the consent.

The system operator will not provide any information to any governmental agency without (1) a subpoena or court order, or (2) the subscriber's consent. The operator is also required to promptly notify the user of the request unless the court orders otherwise. If at all possible, the operator must delay providing the information for a reasonable time so the user has the ability to contest the disclosure.

The system operator is also required to disclose to users copies and allow the copying of any individual information developed by the system that pertains to the user. In some circumstances, the system operator is allowed to contest the subpoena, etc. on its own.

These guidelines were created in an attempt to forestall governmental action. Whether the government will ever pass legislation regarding videotext privacy is an open question. So long as the videotext suppliers successfully police themselves, they will be unregulated. But let one "bad apple" videotext supplier violate the implied trust of its users, and the government will regulate the industry. ●

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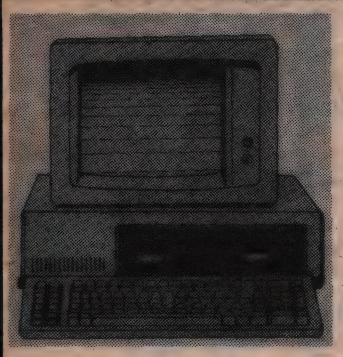

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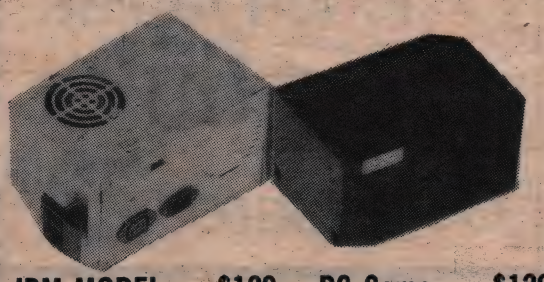

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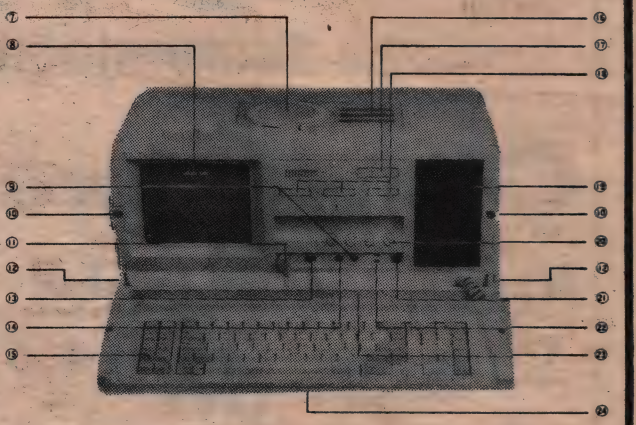

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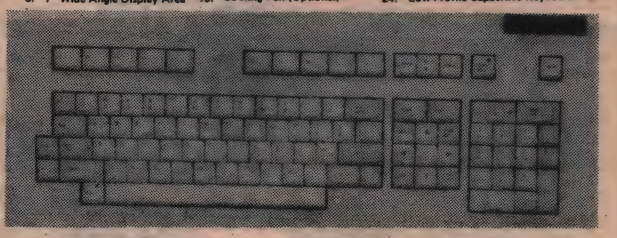

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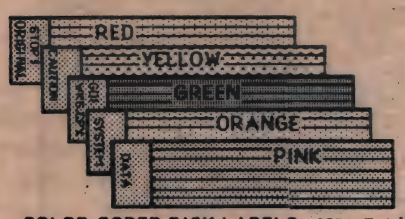

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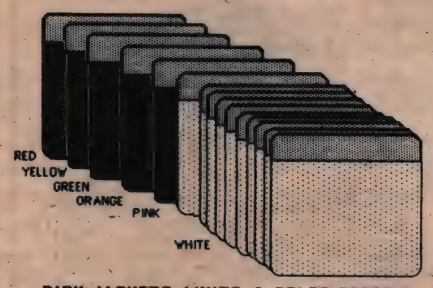

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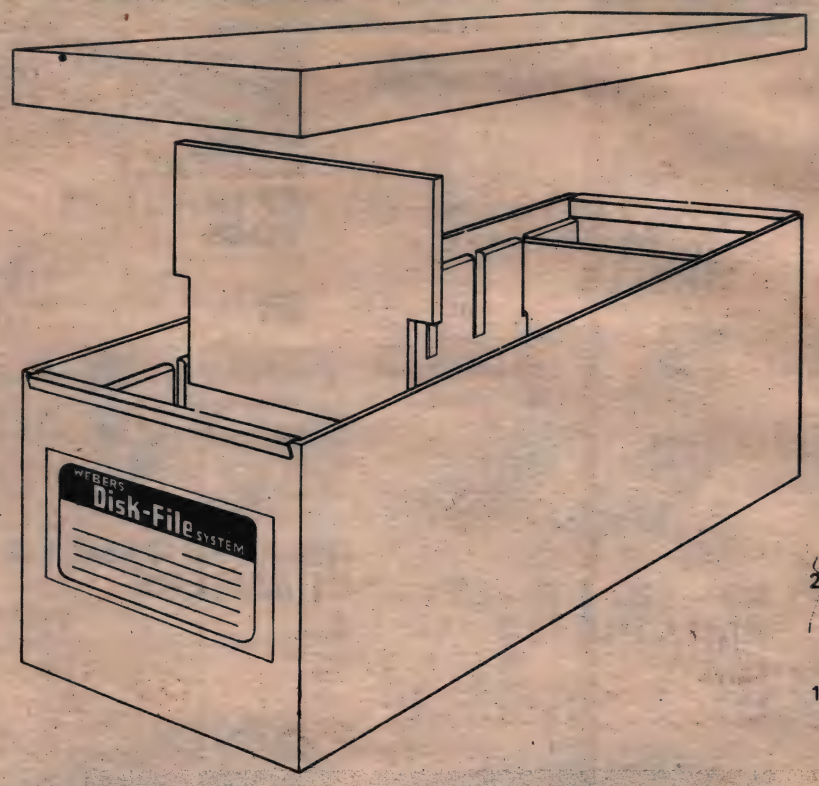

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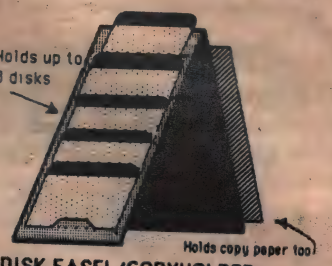

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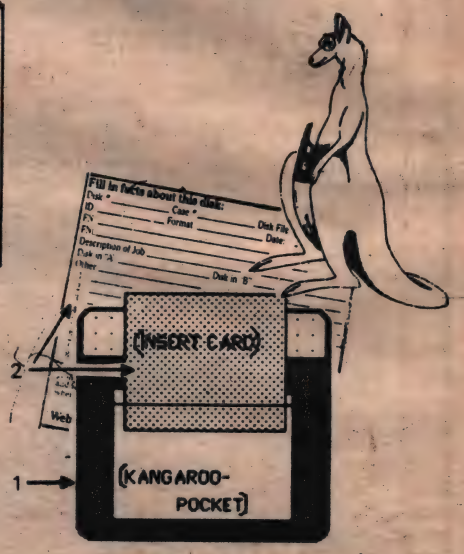

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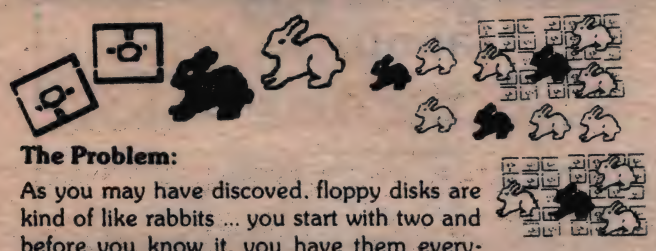

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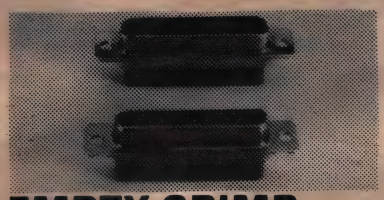

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C37S	1.06	0.96	0.88
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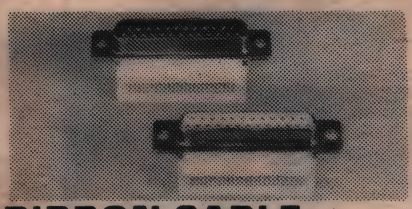

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IDC-37P	8.22	7.47	6.85
IDC-37S	8.92	8.11	7.43
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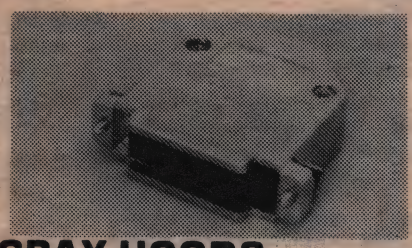
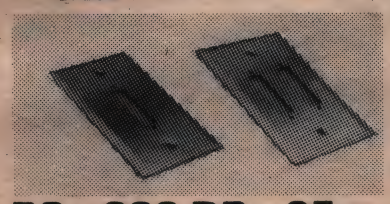


GRAY HOODS

PART #	1-49	50-99	100-UP
	PRICE/QTY		
GH-9	1.02	0.93	0.85
GH-15	1.04	0.95	0.87
GH-25	.95	0.80	0.66
GH-37	1.18	1.07	0.98
GH-50	1.32	1.20	1.10

CONTACTS FOR EMPTY CRIMP SHELLS

PART #	1-99	100-999	1000-UP
	PRICE/QTY		
CP20P	0.08	0.07	0.06
CP20S	0.10	0.09	0.08



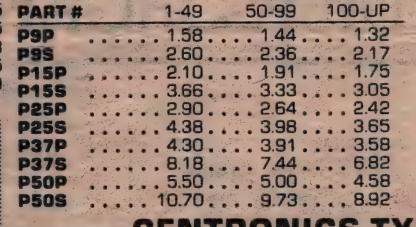
RS—232 DB—25 WALL PLATES

metal wall plates

PART #	1-24	25-49	50-UP
	PRICE/QTY		
WP-1	2.95	2.66	2.36
WP-2	3.45	3.11	2.76

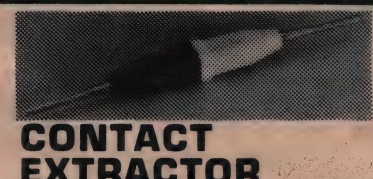
P.C. MOUNT STRAIGHT

PART #	1-49	50-99	100-UP
	PRICE/QTY		
P9P	1.58	1.44	1.32
P9S	2.60	2.36	2.17
P15P	2.10	1.91	1.75
P15S	3.66	3.33	3.05
P25P	2.90	2.64	2.42
P25S	4.38	3.98	3.65
P37P	4.30	3.91	3.58
P37S	8.18	7.44	6.82
P50P	5.50	5.00	4.58
P50S	10.70	9.73	8.92



SOLDER POT TYPE

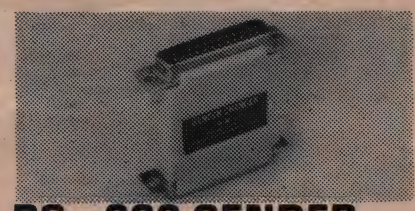
PART #	1-49	50-99	100-UP
	PRICE/QTY		
CEN-36P	4.00	3.64	3.33
CEN-36S	4.20	3.82	3.50
CEN-36SCM	3.50	3.18	2.92



CONTACT EXTRACTOR TOOL

extracts contacts from D crimp shells

PART #	PRICE/QTY PRICE
EX-1	2.75 EACH



RS—232 GENDER CHANGERS

PART #	1-9	10-UP
	PRICE/QTY	
AGC-M	9.95	7.95
AGC-F	9.95	7.95

P.C. MOUNT RIGHT ANGLE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
R9P	2.54	2.31	2.12
R9S	2.60	2.36	2.17
R15P	2.98	2.71	2.48
R15S	3.10	2.82	2.58
R25P	3.72	3.38	3.10
R25S	3.00	2.73	2.50
R37P	4.70	4.27	3.92
R37S	4.90	4.45	4.08
R50P	9.72	8.84	8.10
R50S	11.00	10.00	9.17

CRIMPING TOOL

for crimping D series contacts

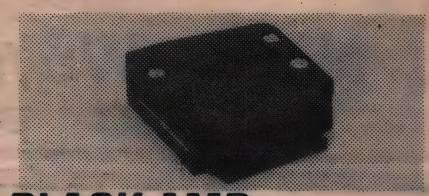
PART #	PRICE/QTY PRICE
CT-1645	79.95 EACH

D-SERIES HARDWARE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
MDH-1	0.55	0.45	0.35
FDH-1	0.85	0.75	0.65

SOLDER POT TYPE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
9P	1.44	1.31	1.20
9S	1.94	1.76	1.62
15P	1.96	1.78	1.63
15S	2.60	2.36	2.17
DB-25P	1.85	1.60	1.45
DB-25S	2.10	1.85	1.65
37P	4.00	3.64	3.33
37S	5.20	4.73	4.33
50P	5.08	4.32	4.23
50S	7.80	7.09	6.50



BLACK AMP HOODS

PART #	1-49	50-99	100-UP
	PRICE/QTY		
AH—25	1.30	1.18	1.08

SHEILDED HOOD

PART #	1-49	50-99	100-UP
	PRICE/QTY		
SH-25	1.35	1.23	1.13

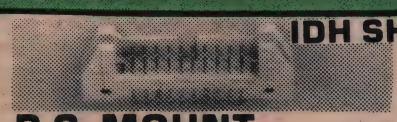
CENTRONICS TYPE CONNECTORS

RIBBON CABLE CRIMP ON

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDC-36P	6.00	5.45	5.00
IDC-36S	7.90	7.18	6.58

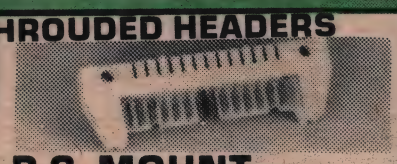
RIBBON CABLE CONNECTORS

IDH SHROUDED HEADERS



P.C. MOUNT RIGHT ANGLE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDH-10R	0.80	0.72	0.64
IDH-20R	1.20	1.08	0.96
IDH-26R	1.50	1.35	1.20
IDH-34R	2.00	1.80	1.60
IDH-40R	2.40	2.16	1.92
IDH-50R	2.95	2.66	2.36
IDH-60R	3.86	3.47	3.09



P.C. MOUNT STRAIGHT

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDH-10	0.80	0.72	0.64
IDH-20	1.15	1.04	0.92
IDH-26	1.50	1.35	1.20
IDH-34	1.95	1.76	1.56
IDH-40	2.30	2.07	1.84
IDH-50	2.85	2.57	2.28
IDH-60	3.45	3.11	2.76

.1 x .1 spacing, gold plated pins

IDH BREAKAWAY HEADER STRIPS

P.C. MOUNT STRAIGHT

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDH-10B	0.30	0.27	0.25
IDH-14B	0.42	0.38	0.35
IDH-16B	0.48	0.44	0.40
IDH-20B	0.60	0.55	0.50
IDH-26B	0.78	0.71	0.65
IDH-34B	1.02	0.93	0.85
IDH-40B	1.20	1.09	1.00
IDH-50B	1.50	1.36	1.25
IDH-60B	1.80	1.64	1.50
IDH-80B	2.40	2.18	2.00

P.C. MOUNT RIGHT ANGLE

PART #	1-49	50-99	100-UP
	PRICE/QTY		
IDH-10BR	0.38	0.35	0.32
IDH-14BR	0.53	0.48	0.44
IDH-16BR	0.61	0.55	0.51
IDH-20BR	0.76	0.69	0.63
IDH-26BR	0.99	0.90	0.82
IDH-34BR	1.29	1.17	1.08
IDH-40BR	1.52	1.38	1.27
IDH-50BR	1.90	1.73	1.58
IDH-60BR	2.28	2.07	1.90
IDH-80BR	3.04	2.76	2.53

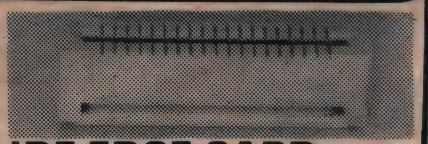
dual row .1 x .1 spacing, gold plated pins

ALTEX ELECTRONICS

RIBBON CABLE CRIMP ON CONNECTORS

IDS SOCKET TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDS-10	1.15	1.04	0.92
IDS-14	1.35	1.22	1.08
IDS-16	1.45	1.31	1.16
IDS-20	1.50	1.35	1.20
IDS-26	2.40	2.16	1.92
IDS-34	2.90	2.61	2.32
IDS-40	3.50	3.15	2.80
IDS-50	4.25	3.83	3.40
IDS-60	5.80	5.22	4.64

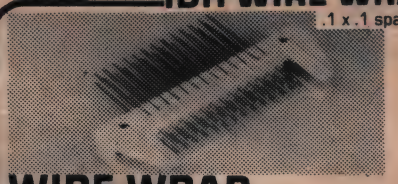


IDE EDGE CARD TYPE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDE-10	1.90	1.71	1.52
IDE-14	2.00	1.80	1.60
IDE-20	2.25	2.03	1.80
IDE-26	2.65	2.39	2.12
IDE-34	2.95	2.66	2.36
IDE-40	3.50	3.15	2.80
IDE-50	4.25	3.83	3.40

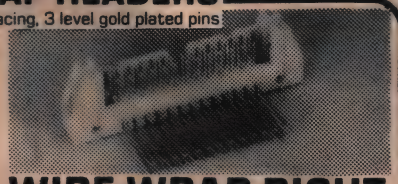
IDH WIRE WRAP HEADERS

.1 x .1 spacing, 3 level gold plated pins



WIRE WRAP STRAIGHT

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10W	1.50	1.35	1.20
IDH-20W	2.55	2.30	2.04
IDH-26W	3.20	2.88	2.56
IDH-34W	3.75	3.38	3.00
IDH-40W	4.50	4.05	3.60
IDH-50W	5.50	4.95	4.40



WIRE WRAP RIGHT ANGLE

PART #	PRICE/QTY 1-49	50-99	100-UP
IDH-10WR	2.45	2.21	1.96
IDH-20WR	2.60	2.34	2.08
IDH-26WR	3.25	2.93	2.60
IDH-34WR	3.80	3.42	3.04
IDH-40WR	4.65	4.19	3.72
IDH-50WR	5.55	5.00	4.44

IDP PLUG CONNECTOR

mates with IDS type connectors

PART #	PRICE/QTY 1-49	50-99	100-UP
IDP-20P	3.95	3.16	2.53
IDP-34P	4.95	3.96	3.17
IDP-50P	5.95	4.76	3.81

IDD DIP PLUG CONNECTOR

for pluging into IC sockets

PART #	PRICE/QTY 1-49	50-99	100-UP
IDD-14	1.30	1.17	1.05
IDD-16	1.65	1.49	1.34
IDD-24	2.25	2.03	1.82
IDD-40	3.90	3.51	3.16

RIBBON CABLE ASSEMBLYS

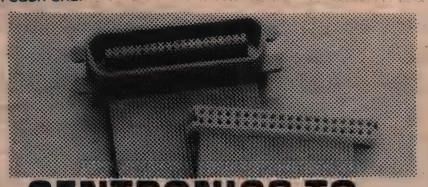
D-SERIES RIBBON CABLES

PART #	PRICE
9P-9P	8.00 + .18 per foot
9P-9S	8.28 + .18 per foot
9S-9S	8.56 + .18 per foot
15P-15P	9.72 + .30 per foot
15P-15S	10.10 + .30 per foot
15S-15S	10.48 + .30 per foot
25P-25P	10.50 + .50 per foot
25P-25S	11.10 + .50 per foot
25S-25S	11.30 + .50 per foot
37P-37P	16.44 + .74 per foot
37P-37S	16.95 + .74 per foot
37S-37S	17.80 + .74 per foot

GENDER MENDERS

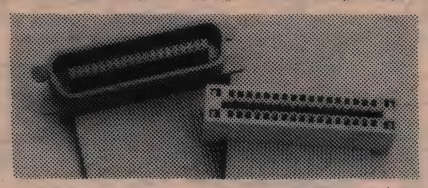
PART # GM—25	PRICE
GM-25	22.50 + .50 per foot

25 pin RS-232 cable with a male and female connector on each end.



CENTRONICS TO IDS-40 RIBBON CABLES

PART #	PRICE
36P-40S	9.50 + .72 per foot



CENTRONICS TO IDE-34 RIBBON CABLES

printer cable for TRS-80 computers

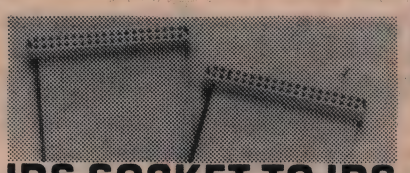
PART #	PRICE
36P-34E	10.25 + .68 per foot

IDE EDGE CARD TO IDE EDGE CARD RIBBON CABLES

PART #	PRICE
10E-10E	3.80 + .20 per foot
14E-14E	4.00 + .28 per foot
20E-20E	4.50 + .40 per foot
26E-26E	5.30 + .52 per foot
34E-34E	5.90 + .68 per foot
40E-40E	7.00 + .80 per foot
50E-50E	8.50 + 1.00 per foot

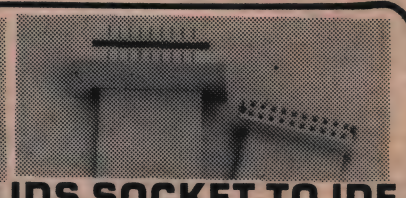
CENTRONICS 36 PIN RIBBON CABLES

PART #	PRICE
36P-36P	12.00 + .72 per foot
36P-36S	13.45 + .72 per foot
36S-36S	15.90 + .72 per foot



IDS SOCKET TO IDS SOCKET RIBBON CABLES

PART #	PRICE
10S-10S	2.30 + .20 per foot
14S-14S	2.70 + .28 per foot
16S-16S	2.90 + .32 per foot
20S-20S	3.00 + .40 per foot
26S-26S	4.80 + .52 per foot
34S-34S	5.80 + .68 per foot
40S-40S	7.00 + .80 per foot
50S-50S	8.50 + 1.00 per foot
60S-60S	11.60 + 1.20 per foot



IDS SOCKET TO IDE EDGE CARD RIBBON CABLES

PART #	PRICE
10S-10E	3.05 + .20 per foot
14S-14E	3.35 + .28 per foot
20S-20E	3.75 + .40 per foot
26S-26E	5.05 + .52 per foot
34S-34E	5.85 + .68 per foot
40S-40E	7.00 + .80 per foot
50S-50E	8.50 + 1.00 per foot

IDD DIP PLUG TO IDD DIP PLUG RIBBON CABLES

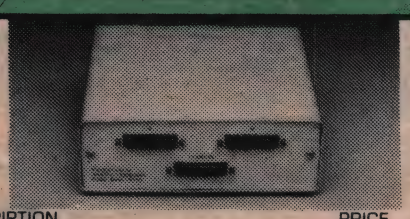
PART #	PRICE
14D-14D	2.60 + .28 per foot
16D-16D	3.30 + .32 per foot
24D-24D	4.40 + .48 per foot
40D-40D	7.80 + .80 per foot

PARALLEL PRINTER CABLES

IBM PC TO PARALLEL PRINTER

PART #	PRICE	10-UP
PPC-301-5	19.95	16.95
PPC-301-10	24.95	19.95

SERIAL/PARALLEL DATA TRANSFER SWITCHES



PART #	DESCRIPTION	PRICE
AB-25	RS-232 SWITCHBOX	88.00

switches all 25 lines; two positions for interfacing; two printers to one computer or one printer to two computers

PART #	DESCRIPTION	PRICE
AB-36	PARALLEL SWITCHBOX	138.00

switches all 36 lines two positions for interfacing two computers to one printer or two printers to one computer.

PART #	DESCRIPTION	PRICE
AB-5	RS-232 5 PORT SWITCHBOX	149.95

switches 12 lines 5 positions for connecting any one of five terminals to one serial modem or five parallel printers to one computer or vice versa.

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Nashua DSDD	10/Box	1.80	1.48	1.45	1.23
Maxell MD1-D	10/Box	1.58	1.48	1.39	1.37
Maxell MD2-D	10/Box	2.07	1.95	1.85	1.80
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Monochrome/Graphics & Printer Card (Hercules comp.) $170
MFC Card, AST comp. 6 Pack with Game Adapter, OK $150
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Graphics Printer Card with 32K buffer (MicroBuffer II comp.) $100
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Fontmaster

A Review
by Cheryl Peterson

Fontmaster is another word processing program (aren't there enough, already?) with a slightly different twist. With it, the documents you create can be printed out in a variety of typestyles. The sixteen typestyles provided with Fontmaster are illustrated in Figure 1. As you can see, some interesting effects can be created.

To use Fontmaster, you'll need a Commodore 64, 1541 disk drive, a Xetec or similar printer interface, and either an Epson or Gemini 10X code compatible printer. (Sorry, but it doesn't work with Commodore printers.) I used a Card? +G interface and an Epson RX-80 FT + printer. To work properly all linefeeds from interface and printer must be off.

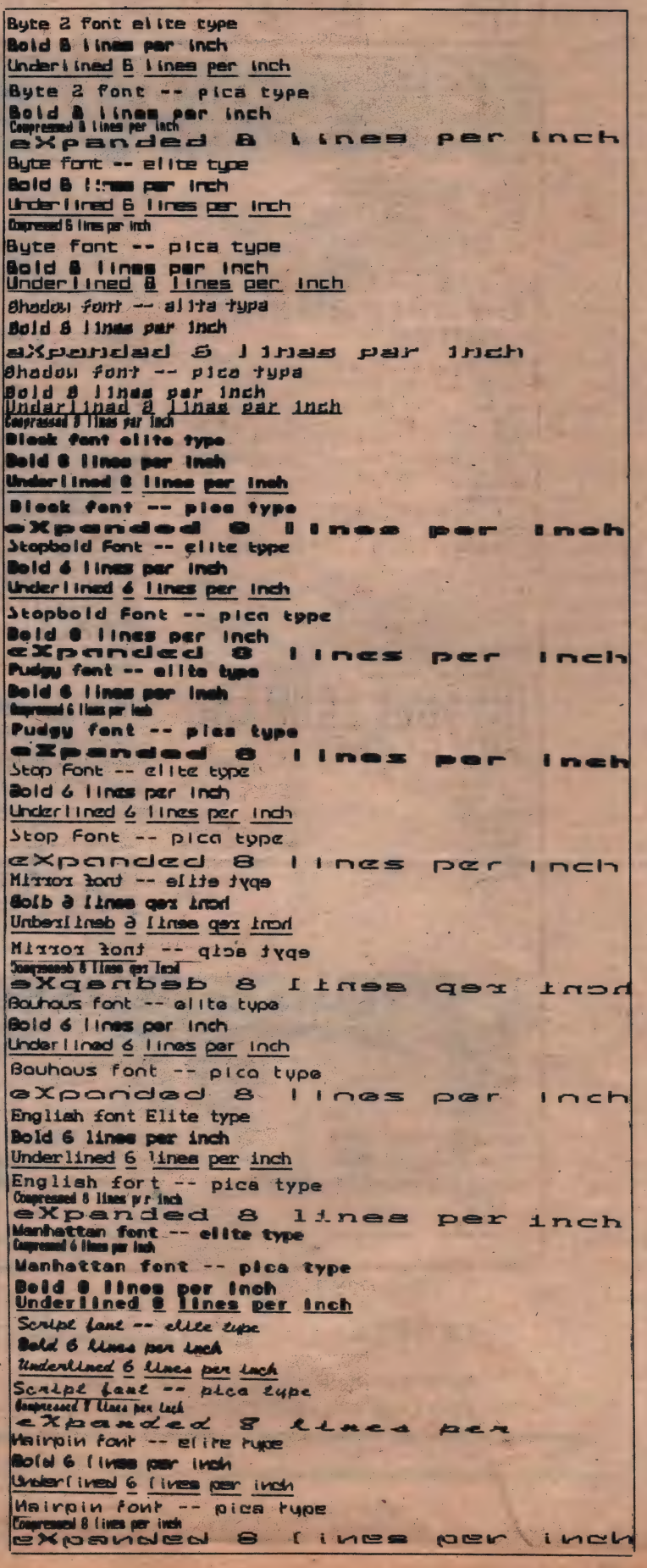
There are actually three separate programs to use. The first, called Fonts+, lets you set up your printer and choose the font you want to use when printing out something from memory. Using special commands you can turn on or off all of the printers special functions, like underline and boldface. Using this procedure you can do some nice program listing, invitations, etc.

The Fontmaster program is the actual work processor. With it you enter text, format it and set the font commands to print the piece the way you want it. You can use up to eight different fonts in each document.

As a word processor, this program leaves little to be desired. It has the usual formatting and text control functions of good word processors. Block manipulations require marking the block and then cutting the piece and pasting it elsewhere. It works fine. Find and replace are easy to use and paragraphs can be reformatted with the touch of a couple of keys. Word wrap is an on/off toggle, as is insert mode.

All the page formatting commands are contained in a parameter table accessed by hitting the Commodore key and the back arrow simultaneously. Once there you can move through the menu using the up and down arrow keys. When choices are complete, repeating the Commodore/back arrow combina-

Continued on page 165



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TANDON TM848-2	8" DS/DD	$235	$225
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Fontmaster
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tion puts you back in your document.

One very nice feature is the rough draft mode. From inside the document a two key combination will send the remainder of the piece out to the printer. Using this feature, it isn't necessary to print the whole piece just to see how a part will look. The back arrow key acts as an escape, so you can stop printing at any time.

The cursor movement functions are great. You can move by lines, characters, words, pages, to either end of the current line or to the top or bottom of the document with simple key combinations. There are almost as many options for deleting text (well, maybe I'm exaggerating just a bit.)

The documentation is adequate, but not impressive. It covers the subject, but doesn't contain much tutorial material. The index is barely adequate, but the appendixes are thorough. This program has a LOT of commands to learn, but most of them are mnemonic so they aren't too difficult to remember. I would have liked to see a quick reference card. The guide printed inside the back cover is great, but I like something I can just shove under the monitor and only refer to when I'm desperate.

In addition to the usual plethora of functions that a word processor has, this one also has the commands to change fonts and style of printing. You can imbed commands to change between any of eight font types and each of these can be printed:

Boldface
Underlined
Inversed
Elite or Pica pitch
Compressed
Expanded
Super- or subscript
6 or 8 lines per inch

The fonts themselves are even fairly well done.

So what's wrong with it, you wonder? It can only read its own files, so any documents you've created with other word processors will have to be retyped. I tried accessing files from Homeword, Write Now!, and Word Writer with no success.

AND it's copy protected. The fact that it's copy protected wouldn't bother me a great deal except that the company provides NO backup disk. You can't buy one from them, except by purchasing another copy of Fontmaster. The documentation even goes so far as to warn the user that he is not allowed to make a copy even for archival purposes. (According to the copyright laws of the United States, Xetec is all wet. But that's an argument for an editorial, not a software review.)

If anyone were to find a legitimate use for this package (and I can think of several), he would be a fool to do business based on a software package that could die on him at any power spike. Even in a non-commercial application, like printing up the monthly newsletter for the garden club, when people are counting on you, it would be hard to explain how the job didn't get done because the software died and you didn't have a backup. I think Xetec has a serious attitude problem here that they need to get cleared up.

For the record, I did attempt to make a backup copy just to see what the results would be. Using a normal disk copying program (the copy routine provided by Fast Load,) I tried to duplicate the disk. On running the "new" Fontmaster, I was informed that I was using an unauthorized duplicate and that the program would proceed to reformat my disk. Various whirrs, clicks and banging of disk drive head later, I checked the disk's directory only to find that the programs were still listed. Nothing would convince them to run, however.

As I am not a pirate, I pursued the matter no further. My

Continued on page 166

Apple Computer Shipping MacDraw Graphics Software For Macintosh

Apple Computer is now shipping MacDraw, a structured graphics application for the Macintosh personal computer. MacDraw offers the Macintosh business user a wide range of design and illustrative features that are both powerful and easy to learn.

Any manager can use MacDraw as a tool for creating professional presentation materials to be used in meetings and reports. Engineers, architects, and graphic designers can use MacDraw to create flow charts, technical diagrams, maps, and graphics illustrations. Precision drawing is possible by using a selection of useful graphics shapes that include straight lines, arcs, rectangles, and circles with such measurement aids as rulers, grids, and sizing capabilities. MacDraw also offers the user added flexibility with features that include text rotation, reduce and reduce-to-fit capabilities, and has the ability to rearrange, resize, reshape, or delete objects as needed.

MacDraw is different from "painting" software programs, such as MacPaint, because it emphasizes structured graphics rather than free-hand drawing and artistic graphics. MacDraw's palette of graphic shapes simplifies the creation of illustrations because the graphics are recognized as individual entities that can be combined, modified, or manipulated easily.

For example, MacDraw is ideal for constructing floor plans. Using the mouse, the user can design partitions and furniture easily and accurately and add shading to distinguish objects. If it is an exceptionally large floor plan, the reduce-to-fit feature will allow the entire document to be seen and modified on the screen. Individual objects can be rotated, moved, or deleted to make changes easy. Text can also be added for labels.

MacDraw can create documents as large as eight by ten feet, and can handle up to four open documents at any time. MacDraw can be combined with MacWrite (word processing), MacPaint (free-hand drawing and graphics), MacProject (project management), and other Macintosh applications. In addition, MacDraw can be used with the Apple LaserWriter and ImageWriter printers to produce high-quality graphics illustrations.

MacDraw is available from authorized Apple dealers. The suggested retail price is $195. For more information contact Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA, 95014, (408)-996-1010.

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Fontmaster
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efforts were sparked only by the desire to include the information in this article. Fortunately I had the good sense to copy the program to an empty disk. There is a good chance that had I copied the Fontmaster files to a disk with other data, I would have lost all my old files. A word to the wise should suffice.

On top of Xetec's no backup statement comes the third procedure on the disk; editing fonts. Fontmaster has a separate program to help you edit new fonts. You can start from scratch or modify any font provided. (See Illustration 2 for a comparison of their Byte font with my edited version.)

After warning that you can't make a backup, the documentation actually encourages you to put your newly created fonts on the master disk. It's much more convenient that way. If you don't, you must swap disks when you want to use your own fonts. This swap requires appropriate commands, of course. Can't have the program thinking the old master disk is still in there.

Although the font editor is designed fairly well, it is slow and tedious work to modify a font. Each pixel must be changed individually. There is no way to insert a blank row of spaces, move the character around or anything like that, so if your newly created character is just slightly off center the whole thing will have to be redone. My edit to the Byte font took ALL of three hours to do. It's not quite as nice as some sprite editors I've used, but after all it's part of a larger package that performs well.

Although I like the performance of the programs, I can't recommend Fontmaster until and unless Xetec changes their attitude on backups. For a cheapo game that you can live without for a few weeks while awaiting a replacement disk, copy protection isn't so bad. But on a program that you count on to meet a deadline, no way!

Also, without being able to take files from another word processor and enter them in to be edited with Fontmaster, the usefulness of the program becomes severely diminished. Maybe for a new user who hasn't got time invested in using a different program for his documents, it might be a good deal. It isn't as "friendly" as Homeword, but it has many more features. The price is certainly right.

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3010 Arnold Road
Salina, KS 67401
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The Sears 4984 Color Monitor

by Philip Chien

The era of home computers with 40-column screens is drawing to a close. Sure, there are still videogames and small micros which still attach to a television with an RF-modulator, but today most serious users want a full 80-column line. The 40-column width was selected because of the bandwidth of the NTSC (National Transmission Standards for Color) video signal, and the low resolution of home television sets. Normal television sets (which most users were using as televisions and as computer terminals) can't handle the bandwidth needed for 80-column text. Therefore, most users have to use a monochrome (Black and White, or Black and Green, or Black and Amber) monitor for their computers. A few hardy souls who want color graphics also attach a color monitor, or a television set in tandem with the monochrome monitor, and a few rich souls pay the higher price for an RGB (Red Green Blue) monitor (a special monitor with the bandwidth to display both color and 80-column screens).

Now, for those of us who can't spend up to $600 for an RGB monitor, there is another solution. Sears has a new color television, the Model 4084, which doubles as a computer monitor. Actually, it's a triple purpose device. It can function as a standard television, a color video monitor, and an RGB monitor. Amazingly, the price is under $350 (varies from loca-

Continued on page 168

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The Sears
Continued from page 166

tion to location.)

In the RGB mode, the 4084 does quite a good job of showing text and graphics. The monitor uses an 8-pin EIA connector for the RGB input, and has a separate RCA female jack for audio input. A special "screen compress" switch shrinks the screen's height by 30%, producing more read able characters.

Different computers will require different cables. Sears sells an RGB cable for the IBM-PC, but if you have a different computer, you will need to obtain the correct interface and cable yourself.

In the video mode, the monitor does double duty as a standard composite video color monitor. Standard RCA jacks are used for both video and audio. Should you attach your computer's video output to this video input, the Sears 4084 will do an excellent job of displaying color graphics and 40-column text, but any 80-column text will be illegible. If your computer only displays 40 columns of text, though, then you won't lose anything. If you also have a video tape recorder, laser disk, or other video output device, it can also be attached here.

The television mode features all of the standard features available on present electronic television sets. You can pre-set 12 channels on the front panel selector. The tuner will receive VHF, UHF, and mid-band cable channels.

In all modes a "green only" switch will turn off the Blue and Red guns of the tube, changing the set into a green screen monitor. Channel adjustments, color, tint, brightness, contrast, Vertical hold, and auto-color controls are easily accessed through a side panel. The panel also includes a separate brightness control for the RGB mode, and a screen centering control.

The television/monitor is excellent for most purposes, but like most things which "do everything," it doesn't do everything as well as it's supposed to. It is an output only device, there are no output jacks to attach another monitor or other external device. There is no earphone jack or other audio output, and there is no remote control capability.

In my own personal setup, I use the 4084 in all three modes. The television mode is attached to my cable jack and the

Continued on page 169

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Intel's 27C256 CHMOS (complementary high-performance metal-oxide semiconductor) EPROM is pin-for-pin compatible with its 27256 HMOS EPROM, yet provides high-speed performance, low power consumption and noise immunity. In addition, the new EPROM is one element of Intel's complete CHMOS product kit composed of the 80C86/80C88 microprocessors, 80C51/80C31 microcontrollers and peripheral components.

All the products in Intel's CHMOS kit were designed to work together to simplify design technique, provide a growth path for future systems and improve system reliability.

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The low power requirements of CHMOS technology allow the 27C256 to operate at a lower temperature, thereby increas-

Continued on page 180

Micro/Systems Journal To Be Published

Sol Libes, the former editor of Microsystems magazine, has announced that he will publish a new magazine called *Micro/Systems Journal*. It will be oriented to the advanced computer user. It is intended for persons doing software and hardware systems development and integration work on microcomputers.

Micro/Systems Journal will carry articles on programming in the C and Pascal languages as well as Assembler and on how these languages can be used to control system level operations on machines using operating systems such as MS/DOS, CP/M, TurboDos

Continued on page 179

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The Sears
Continued from page 168

video mode is attached to my video tape recorder. In the RGB mode, I've successfully attached my Apple to the 4084 using the Microtek Rainbow 256 card, and the Taxan 410-08 and 8064 cards.

If your computer has an 80-column RGB output, you may need a special cable to attach it to the 4084. If your computer doesn't have a built-in RGB output, it may be possible to add one. If your device only has a 40-column display, then the RGB mode is redundant, and you'll probably be better off attaching it using the composite video mode.

My only major complaint about the 4084 is its shielding. When I first installed the monitor, I placed it on top of my Apple. My disk drives wouldn't boot. Moving the monitor off the top of the drives solved the problem, but putting a cassette recorder on top of the monitor caused the screen to "warp." The magnet in the speaker of the recorder was causing the guns to misfire. Removing the recorder stopped the problem. If Sears decides to update the 4084, I hope they add some extra shielding into the case.

Sears has always had a good reputation for its repair policies, but the technical knowledge of their sales staff will vary greatly from location to location. Some Sears salespeople know computers very well, and will be able to tell you what you need to attach the monitor to your computer without any doubt. But, the salesperson at my local Sears told me that it was impossible to attach the 4084 to an Apple II. For quite obvious reasons, if I believed that salesperson I wouldn't have purchased it. Since a special cable is required for most setups, I highly recommend that you check with a good computer consultant before deciding to buy the 4084, and have that consultant show you what hardware is required.

Vital Statistics

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The new RELI-A/B is the first of a soon-to-be released line of mechanical and solid state switches, many with the capability of switching well over two megabits per second.

Complete specifications and pricing are available from RELIable Electronics, Inc., 519 South Fifth Avenue, Mount Vernon, NY, 10551. Sales offices are in Stratford, CT, at (203)-375-1831. ●

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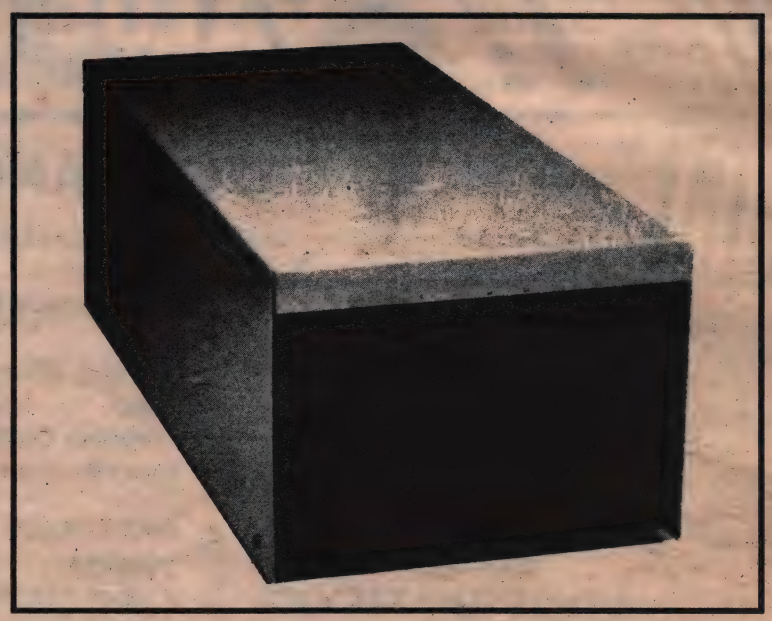

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New HP Touchscreen Computers

The Hewlett-Packard Company has introduced two new models of its Touchscreen personal computer, along with a variety of software to enhance the company's office-automation offerings.

The new computers, HP Touchscreen II and Touchscreen MAX II, have larger displays, more memory and a greater communication capability than their predecessor models. Prices for the new computers begin at $3,545.

In addition, the company is offering new software that enables users to tap the power of minicomputers in an office environment. HP Access brings closer integration between personal computers and the HP 3000 minicomputer, and HP Print Central allows multiple personal-computer users in a workgroup to share a high-quality printer attached to an HP 3000.

Part of HP's Personal Productivity Center office system, these products support HP's goal of providing integrated products that work together, combining office automation, data processing, personal computing and communications to increase productivity in the workplace.

Touchscreen II and Touchscreen MAX II personal computers have an enhanced combination of memory and communication cards for greater information sharing between HP and IBM personal computers, and among HP, IBM and DEC minicomputers and mainframes.

HP Touchscreen II has two 710-kilobyte, 3½-inch microfloppy disc drives. Touchscreen MAX II comes with a choice of 10- or 20-megabyte Winchester disc drives and a single 710-kilobyte, 3½-inch microfloppy disc drive.

In addition, HP's new workstations have 12-inch screens, an increase from 9-inch screens of the previous Touchscreen computers. The Touchscreen II computers are completely compatible with their predecessors, as well as with the HP LaserJet and ThinkJet printers. The touchscreen user interface is optional.

"One of our aims is to provide greater office-automation benefits by giving people the advantages of a stand-alone workstation as well as the ability to share resources by connecting to other PCs or larger computers," said William J. Murphy, marketing manager of HP's Personal Computer Group.

HP's new software, HP Access, provides that connection by allowing PC users a simple way to tap into information stored in the larger HP 3000 minicomputer. The information retrieved from the HP 3000, such as financial data, can be transferred into a personal-computer database, such as a spreadsheet.

In other software announcements, HP said that two new software packages, Jetstart and Laserstart, developed by Softstyle, Inc., make the HP ThinkJet and LaserJet printers fully compatible with the Macintosh personal computer from the Apple Computer. Jetstart is priced at $45, while Laserstart sells for $95.

Other software announcements include HP Application Link and HP Word/150. The latter software provides comprehensive word-processing capabilities as a function within the workgroup HP 3000 or as a stand-alone. HP Application Link allows users to access HP financial-management systems on an HP 3000.

For more information contact Hewlett Packard, 3000 Hanover Street, Palo Alto, CA, 94304.

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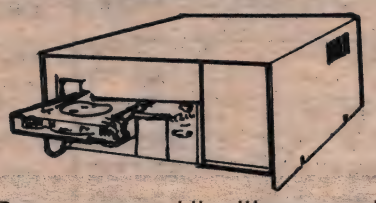

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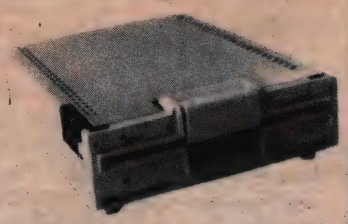

Original equipment drive, compatible with Apple 2e, 2+ and 2C.
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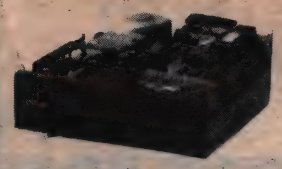
B. 5¼" TANDON DISC DRIVE



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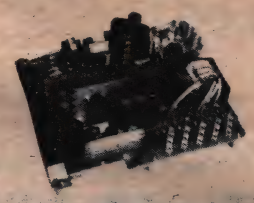
TM55-4 DS/Quad
$99.00

COMPUTER DISC DRIVE SWITCHING POWER SUPPLY



C.
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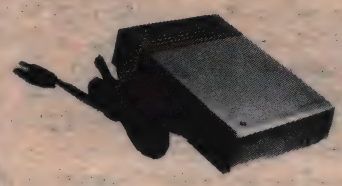

Originally used with the T.I. 99/4A home computer. Sold in "as is" condition. No returns.
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9 VDC @ 100 Ma
Model #6040
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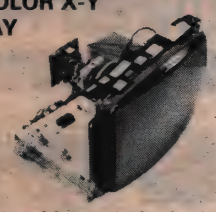
Pin 2 −5 VDC, .1A
Pin 3 +12 VDC, .3A
Pin 4 ground
INPUT: 120 VAC/60 Hz., .25A
Mfr.: Coleco Model 55416 **$6.95** NEW

J. 19" COLOR X-Y DISPLAY



Originally designed for use in Atari coin-operated games. Contains a 19VLUP22 3-gun color tube, focus and brightness controls. Has electromagnetic deflection and solid state circuitry with three "Z" amp inputs (red, green, blue). Ideal for arcade replacement or, with the addition of external circuitry, for color graphics display. Manual included. **$129.00** NEW

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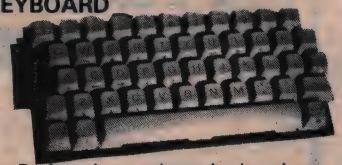

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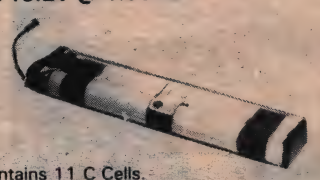
NICAD BATTERY BACK-UPS (RECHARGEABLE)

M. 13.2V @ 1.65 AH



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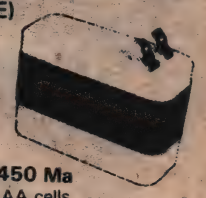

N. 12V @ 450 Ma
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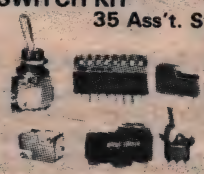

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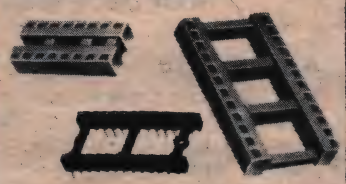

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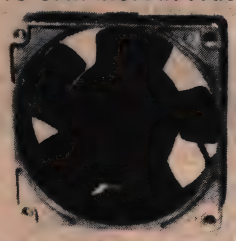

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For dislodging and removing dust, dirt, spilled food or beverages from between keys

Continued on page 179

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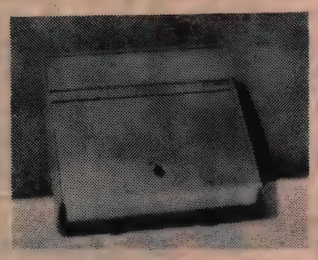

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ans/org (switch sel.)
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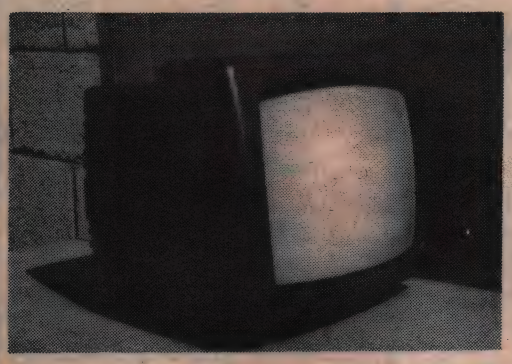

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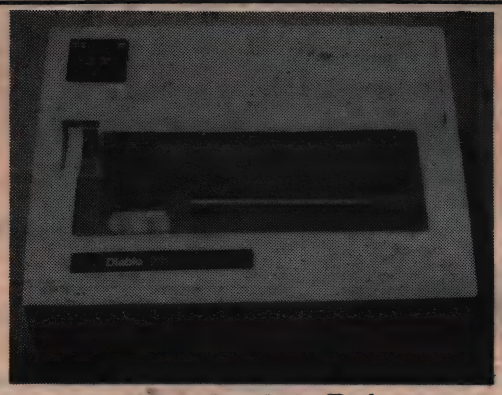

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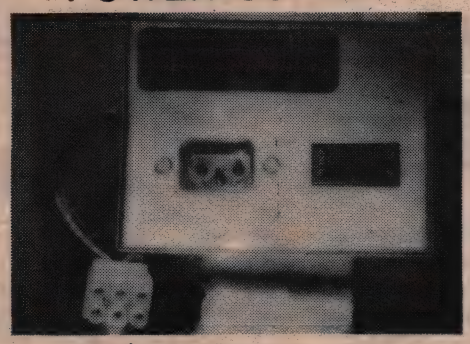

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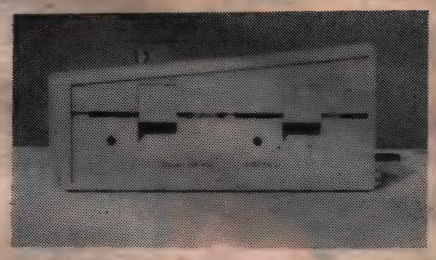

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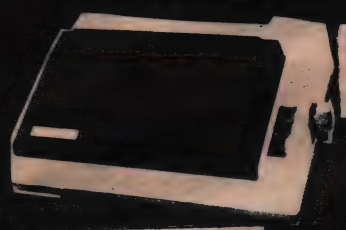

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Digital Introduces VAXstation 500 Workstation

Digital Equipment Corporation introduced the first color-monitor member of its VAXstation™ family of high-resolution graphics workstations. In its base configuration, the VAXstation 500 system is ideally suited for applications in electrical and mechanical computer-aided design (CAD), cartography, molecular modeling, and research. With addition of Wireframe and Solid Shading 3D upgrade options, the VAXstation 500 system can be optimized for mechanical applications in design, finite element analysis, and interference modeling for piping layout.

The VAXstation 500 system is based upon the compact MicroVAX I computer system and incorporates the just-announced Tektronix 4125 color video terminal. Using Digital's MicroVMS operating system, the VAXstation 500 workstation is a stand-alone system that can be linked to other VAX and PDP-11 computers via DECnet/Ethernet local area networks (LANs).

Wide Application Range

"By combining the strengths of the MicroVAX I system and the graphics capabilities of the new Tektronix terminal, the VAXstation 500 is one of the best workstations available," and Steve Hansmire, VAXstation 500 product manager. "Digital's users have access to hundreds of application programs, developed both by Digital and third-party software producers for the family of VAX computers. These form one of the largest sets of applications in electrical and mechanical CAD and in cartography in the computer industry." He added that Digital will provide support for the entire workstation, including the Tektronix 4125 terminal.

The base configuration for the VAXstation 500 system consists of a MicroVAX I processor with one Mbyte of memory, dual 400 Kbyte floppy disk drive, 31 Mbyte mini Winchester-technology hard disk, and graphics subsystem. The graphics subsystem consists of a 19-inch color monitor, 80826/80827 graphics processor, 256 Kbytes of display list memory, 16-million-color pallette, and keyboard. Options include 3D Wireframe and Solid Shading upgrades, additional video memory planes, mouse, tablet, and interfaces to Tektronix' color graphics printers and plotters. The VAXstation 500 is priced from $36,735, with deliveries scheduled to begin later this quarter.

High Performance Graphics

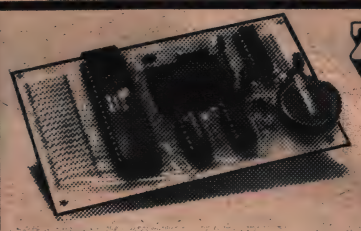
The graphics subsystem employs the newly announced Tektronic 4125 terminal, an enhanced version of Tektronix' 4115 terminal. It has 32-bit coordinate space and the ability to display as many as 256 colors simultaneously.

The subsystem is also available as an option to all other VAX or MicroVAX systems. It is priced from $19,950, with first shipments scheduled for later this quarter.

Features of the subsystem include a precision, in-line gun, 19-inch 60 Hz non-interlaced color monitor with a resolution of 1280 x 1024 pixels. The monitor employs dynamic convergence correction to maintain a convergence accuracy of 0.3mm over the entire display area.

The 3D Wireframe upgrade option enables the subsystem to pan, zoom, and rotate an object. With a single command, users can quickly replicate or rotate objects.

For further information contact Digital Equipment Corporation, Maynard, MA 01754-2198. ●



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#DP043 Toshiba P-1340, P-1350, P-1351, P-1355; Radio Shack TRS80 DMP2100	6.68	6.49	6.30
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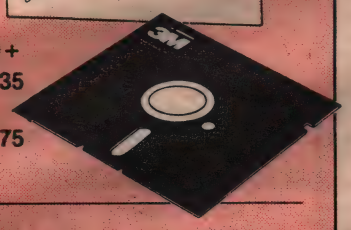

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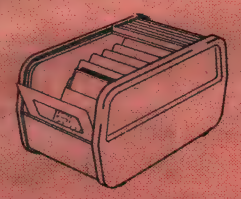

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Feedback
Continued from page 15

displeased with VisiCalc, which I currently use, because of: 1) the copy protection and 2) the company itself, which failed to inform me of low cost program updates (price had risen when I heard of them). I wanted a CP/M spreadsheet to use with WordStar, and was looking forward to using CalcStar, since it can print textfiles to disk to merge directly with WordStar, and the variable column width that it offers.

I purchased SuperCalc² instead, but even this was not too readily available for the Apple. Most places I called had it for around $220, but thanks to your wide variety of ads, I finally unearthed it at $149. It's great, and meshes perfectly with WordStar. I very much hope that this isn't the beginning of a trend toward eliminating MicroPro and other advanced, CP/M products and updates for the Apple.

Here's to *Computer Shopper's* continued success!

Paul Henry Stark
New York, NY

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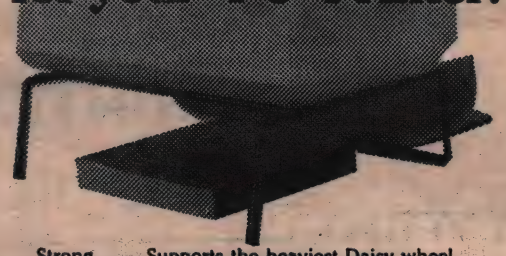

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Dear Editor:

I'm writing in regards to the excellent article that you wrote in the February edition of **Computer Shopper.** I would like to say that I really did enjoy reading about the history of Personal Computers so much so that it stimulated further interest in my mind as you might have guessed.

I would appreciate it very much if you could tell me how many personal computers are in the homes today and also the three most popular home computers.

Any information that you could give me would be greatly appreciated.

Thank you for writing Personal Computers Are Ten Years Old - A Look Back.

Karl Jackson
Fairfax, VA

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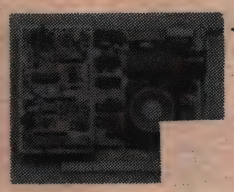
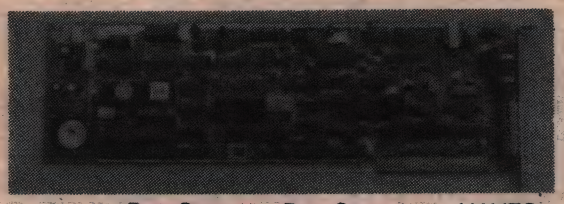


DataComm 12B



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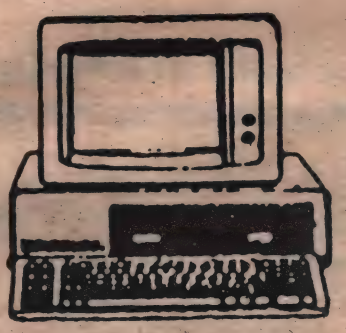

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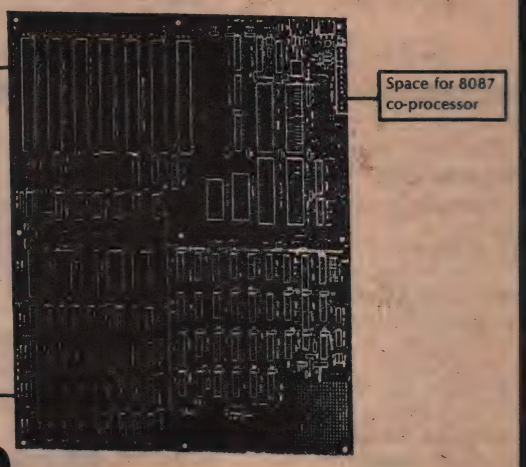

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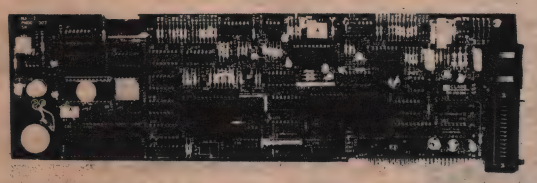

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Read/Right
Continued from page 172

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Micro/Systems
Continued from page 168

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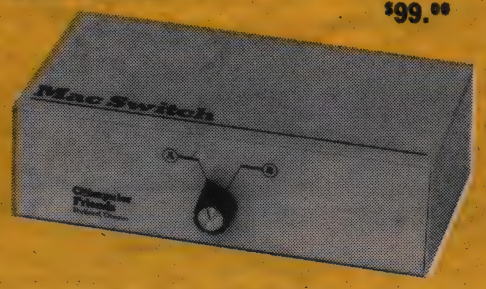

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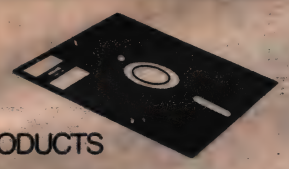

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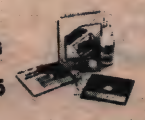

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CMOS
Continued from page 168

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For more information, contact Intel Corp., Literature Dept. W-208, 3065 Bowers Ave., Santa Clara, CA, 95051.

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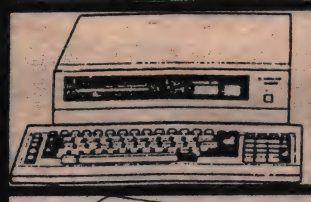

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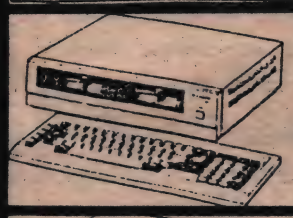

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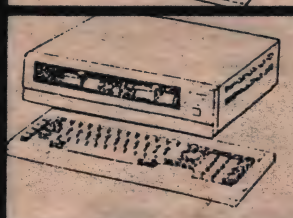

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THE DATAMERICA COMPUTER USER'S GROUP, 312 E. 84 ST. #1A, NYC 10028
THE ROCHESTER S-80 COMPUTER CLUB INC., POB 15476, ROCHESTER, NY 14615
THE SYRACUSE APPLE UG, POB 6586, SYRACUSE, NY 13217
TRI-COUNTY NY, NY CROMENCO U.G., C/O CHARLES PERRELLA, 45F RT 303, VALLEY COTTAGE, NY 10989
TRS 80 USER GROUP, RT. 1, BOX 244, MILL RD., YAPAHANK, NY 11980
TRS-80 UG OF CENTRAL NY, 2362 EAST LAKE ROAD, SKANEATELES, NY 13152
U.A.U.G., C/O UPSTATE COMPUTER SHOP, 99 COMMERCIAL DR. 5A, WHITESBORO, NY 13492
UPSTATE 99/4A UG, POB 13522, ALBANY, NY 12212
UPSTATE NY ATARI COMPUTER ENTHUSIASTS, C/O DALE WHITNEY, BOX 232 MORRIS BLVD., CONKLIN, NY 13748
VAN RENSSELAER COMPUTER USER GROUP, ST. ANTHONY ONHUDSON, WASHINGTON AVE., RENSSALAER, NY 12144
WESTCHESTER FAIRFIELD AMATEUR COMPUTER SOCIETY, R.R. 1, BOX 176, POUND RIDGE, NY 10576
WESTCHESTER PET USER GROUP, POB 1280, WHITE PLAINS, NY 10602
MICROPRO USERS GROUP OF AMERICA, 140 RIVERSIDE DRIVE, NEW YORK, NY 10024

NORTH CAROLINA

ACUSOFT ATARI COMPUTER USERS SOCIETY OF FAYETTEVILLE, PO BOX 1117, FAYETTEVILLE, NC 28302
APPLE CLUB OF FAYETTEVILLE, PO BOX 70, FAYETTEVILLE, NC 2802
CAPE FEAR COMPUTER AND HEATH USER'S GROUP, 2454 VANDEMERE AVENUE, FAYETTEVILLE, NC 28304
CAROLINA APPLE CORE, PO BOX 31424, RALEIGH, NC 27622
CHARLOTTE 99/4A USERS, 2637 CONNEMARA DR., MATTHEWS, NC 28105
CHARLOTTE 99/4A USERS, 2637 CONNEMARA DR., MATTHEWS, NC 28105
GEMS, GREENSBORO EIGHTY MICROCOMPUTER SOCIETY, PO BOX 10014, GREENSBORO, NC 27404
GUILFORD 99ER USERS GROUP, (TI 99/4A), PO BOX 21691, GREENSBORO, NC 27420
MICRO COMPUTER USERS CLUB, RT. 1 BOX 134-A, BOONVILLE, NC 27011
MICRO COMPUTER USERS GROUP OF RALEIGH, 5225 N. BOULEVARD, RALEIGH, NC 27604
NATAHALA COMPUTER CLUB (99'ERS), RT. 3, BOX 64-E, ROBINSVILLE, NC 28771
NATIONAL SOCIETY OF MICROCOMPUTER USERS AND GROUPS, PO BOX 8084, GREENVILLE, NC 27834
PIEDMONT TRIAD ATARI USERS GROUP, 6104 KNIGHT ROAD, GREENSBORO, NC 27410
RALEIGH COLOR COMPUTER CLUB, PO BOX 681, GARNER, NX 27259 C/O DAVID ROPER
RALEIGH OSBORNE COMPUTER CLUB, PO BOX 53754, FAYETTEVILLE, NC 28305
TACC, POB 17523, RALEIGH, NC 27619
TACS, PO BOX 7073, GREENSBORO, NC 27417-0073
TIMEX USERS GROUP, RT. 3 BOX 64E, ROBINSVILLE, NC 28771
TRIAD AMATEUR COMPUTER SOCIETY, PO BOX 7073, GREENSBORO, NC 27417
WILMINGTON TRS-80 USERS GROUP, 1605 PRINCESS ST., WILMINGTON, NC 28401
WILSON TRS-80 USERS' GROUP, PO BOX 336, LUCAMA, NC 27851
CUMBERLAND COUNTY KAYPRO-CP/M PORTABLES USERS GROUP, 5102 CATALPA ROAD, FAYETTEVILLE, NC 28304

NORTH DAKOTA

BASE COMPUTER HOBBYISTS GROUP, C/O 101-1 AVION WAY, MINOT AFB, ND 58704
GRAND FORKS IBM PC U.G., 717 IVES STREET, BUXTON, ND 58218
M.A.D. H.U.G. 99/4A, DENNIS SCHJELDAHL, 509 REEVES DRIVE, GRAND FORKS, ND 58201
TRS-80 COLOR COMPUTER CLUB, PO BOX 218, MINOT, ND 58701

OHIO

ACE (ATARI UG OF COL.), 6632 LISAMARIE RD., COLUMBUS, OH 43229, C/O ED BILL ECKERT
AD A STAR (ATARI MICROCPU NET), C/O JACK McKIRGAN 2 WD8BNG, 4749 SR 207 NE WASHINGTON C.H., OH 43160
AIM-65 USER'S GROUP, C/O DONALD CLEM, RR #2, SPENCERVILLE, OH 45887
AKRON IBM PC CLUB, BOX 1205, AKRON, OH 44309
AMATEUR COMPUTER SOCIETY OF CENTRAL OHIO (ACSCO), PO BOX 28606, COLUMBUS, OH 43228-0606
APPLE SIDERS, C/O DAN McKEE, 5001 RELLEUM AVE., CINCINNATI, OH 45238
APPLE-DAYTON USERS GROUP, POB 1666, FAIRBORN, OH 45324
ATARI USERS GROUP, 6895 N. HIGH ST., WORTHINGTON, OH
BUCKEYE 99ers, 2424 MANSFIELD-LUCAS RD., MANSFIELD, OH 44903
CCC (RS COLOR CPU), PO BOX 478, CANFIELD, OH 44406-0478, C/O ED GINNY KOMARA
CENTRAL OHIO ADAM USERS GROUP, 730 THURBER DR. APT. N, COLUMBUS, OH 43215
CENTRAL OHIO COMMODORE USERS GROUP, 107 S. WESTMOOR AVE., COLUMBUS, OH 43204
CENTRAL OHIO 99ers, 1456 GRANDVIEW AVE., COLUMBUS, OH 43212
CIN-DAY TI USER GROUP, PO BOX 519, WESTCHESTER, OH 45069-0519
CINCINNATI COMP CLUB, 6515 KENVIEW DR., CINCINNATI, OH 45243
CINCINNATI COMPUTER CLUB, ‡@@ CONVERSE DRIVE, CINCINNATI, OH 45240
CINTUG, PO BOX 3991454, CINCINNATI, OH 45239 (513) 474-2983
CLEVELAND DIGITAL GRP, PO BOX 17440, CLEVELAND, OH 44117
COACH (APPLE UG) OF COLUMBUS, C/O JAY WRIGHT, 1887 WILLOWAY CIRCLE N., COLUMBUS, OH 43220
COGWHEELS CINCINNATI OSBORNE GROUP, 6404 COFFEY ST., CINCINNATI, OH 45230
COKUG, CENTRAL OHIO KAYPRO USERS GROUP, C/O I. WEISS, 3775 DANUBE DRIVE, GROVE PORT, OH 43125
COLOR COMPUTER CLUB, PO BOX 478, CANFIELD, OH 44406
COLUMBUS CP/M-ACSCO USERS, BOX 28606, COLUMBUS, OH 43228-0355
COLUMBUS MAX80 USERS, (M.A.X.U.G.), BOX 28606, COLUMBUS, OH 43228-0355
COLUMBUS TRS-80 COLOR COMPUTER USERS, C/O GARY DAVIS, 2153 LEAH LN., REYNOLDSBURG, OH 43068
COLUMBUS VIC-20 USERS GROUP, 169 N. VINE, WESTERVILLE, OH 43081, C/O LEN HOLLAND
COOUG, CENTRAL OHIO OSBORNE USERS GROUP, DEVRY INST., 1350 ALUM CREEK DRIVE, COLUMBUS, OH 43209 C/O DALE BROWN
CUYAHOGA VALLEY COMPUTER CLUB, C/O BRIAN HEIN, 3053 ROHRER RD., WADSWORTH, OH 44281
DATUG, C/O THOMAS H. MAGEE, 3360 Fair Oaks Dr. Xenia, OH 45385
DAY-ATARI, 1461 HUFFMAN AVE., DAYTON, OH. 45403
DAYTON MICROCOMPUTER, 2629 RIDGE AVE., DAYTON, OH 45414
DAYTONIAN COMMODORE TELE-COMPUTE USERS GROUP, PO BOX 24443, DAYTON, OH 45424
DELAWARE OHIO VIC-20 USERS GROUP, PO BOX 216,NEW ALBANY, OH 43054, C/O TOM MARTIN 855-2404
ED YORK CIN DAY USER GROUP, P.O. BOX 519, WESTCHESTER, OH 45069 513-777-0110
ENGLEWOOD COMPUTER USERS GROUP, 313 CANDY LANE, UNION, OH 45322 (513) 836-3273
GOODYEAR COMPUTER CLUB, GOODYEAR TIRE CO., AKRON, OH 43316
IBMACSCO SIG, C/O NEIL, BOX 16086, COLS, OH 43126NEO
APPLE CORP., BOB CALDWELL, 10112 RIDGEWOD DR., TWINSBURG, OH 44087
LAKE ASHTABULA IBM PC UG, POB 175, MADISON, OH 44057
LIMA AREA TI 99/4A USERS GROUP, 1513 WEST WAYNE STREET, LIMA, OHIO 45805
NEO APPLE CORPS, C/O NORM HENKE, 21750 MILLER AVE., EUCLID, OH 44119
NEW HORIZONS, WILLIAM SAGER, 612 MEADOW SPRING, MAUMEE, OH 43537
NORTHEAST OHIO COMMODORE USERS GROUP, 5104 MAYFIELD DR., LYNDHURST, OH 44124
OH-MI-TI, DON WOLLENBECKER, 1522 RESWICK, OREGON, OH 43616
OSBORNE USERS OF COL., OHIO INST. OF TECH, 1350 ALUM CREEK DR., COLUMBUS, OH 43209, C/O BILL HOOKER/ DALE BROWN
OSI, NORTH COAST USER'S GROUP, 30600 NAMHAHASSET RD., BAY VILLAGE, OH 44140
ROBOTICS USERS GROUP, APRIL LANE, COL., OH
RUBBER APPLE USERS GROUP, ROBERT M. NEBIKER, 1870 BROOKFIELD DRIVE, AKRON, OH 44313
SAUCE, STARK APPLE USERS COOPERATIVE EXCHANGE, PO BOX 35091, CANTON, OH 44735
SANYO USERS OF CENTRAL OH, C/O ARNIE SKUROW, 5760 CRAWFORD DR., COLUMBUS, OH 43229
SCREAMING EAGLES, C/O DAVID YAROS, 1006 2ND NAT'L BLDG., CINCINNATI, OH 45202
SOUTHEASTERN OHIO COMPUTER SOCIETY, C/O DON SARGENT, PO BOX 1215, CAMBRIDGE, OH 43725
THE LAKE ASHTABULA IBM PC USERS GROUP, PO BOX 175, MADISON, OH 44057
THE PSYCHOLOGICAL — COMPUTER — CLUB, 2118 FOREST LAKE DRIVE, CINCINNATI, OH 45244
TIMEX-P.O.R.T.S. PORTSMOUTH, OHIO REGION TIMEX AND SINCLAIR USER GROUP, 2002 SUMMIT ST., PORTSMOUTH, OH 45662
TIMEX/SINCLAIR USERS GROUP, 4255 S. HAMILTON, COL., OH
TRI-STATE OSI USERS, C/O TED MORRIS, 6306 KINCAID RD., CINCINNATI, OH 45213
TRS-80—ACSCO, BOX 28606, COLUMBUS, OH 43228

Users Groups

TRS-80 COLOR COMPUTER USERS GROUP, 527 MALVERN DRIVE, PAINESVILLE, OH 44077. C/O ANTHONY RUQUE
TUSCARAWAS COUNTY PERSONAL COMPUTER CLUB, C/O ROBERT D. HOBART, 231 5TH DR. NW., NEW PHILADELPHIA, OH 44663
Z80 NEVADA COBOL USER'S (NUG), BOX 28606. COLUMBUS, OH 43228
ZORBA EQUIPMENT USERS GROUP (ZEUS), BOX 1112, ATHENS, OH 45701
CARNATION CITY 99'ERS, C/O DAVE BRAIN, 205 FERNWOOD BLVD., ALLIANCE, OH 44601

OKLAHOMA

AUTUMN REVOLUTION, PO BOX 55329, TULSA, OK 74115. (918) 663-3436
BIG RED APPLE GROUP, 2301 W. MAIN ST., NORMAN, OK 73069
OKLAHOMA LOCAL OSBORNE GROUP, PO BOX 1851. BETHANY, OK 73008
TIMEX SINCLAIR USERS GROUP, C/O BILL CASEBEER, PO BOX 372, OOLOGAH, OK 74053
TULSA AREA COMMODORE USERS GROUP, C/O CRAIG BOWMAN, 7804 N. 117TH E. AVE., OWASSO, OK 74055 (918)272-9755
TULSA COMPUTER SOCIETY, PO BOX 1133, C/O SI HAWK, TULSA, OK 74105, 918-446-5219
NATIONAL PCjr USER'S GROUP, C/O DAVID WOLLMANN, 1504 E. 71ST PLACE,#1308, TULSA, OK 74136
TULSA REGIONAL ATARI COMPUTER ENTHUSIASTS (T.R.A.C.E.), P.O. BOX-4823, TULSA, OK 74159

OREGON

APPLE BLOSSOM, PO BOX 266, DILLIARD, OR 97432
APPLEUGENE, PO BOX 3267 EUGENE, OR 97403
ATARI COMPUTER ENTHUSIASTS, 3663 VINE MAPLE ST., EUGENE, OR 97405, C/OMICHAEL DUNN
CP/M USER'S GROUP NORTHWEST, 1346 N.E. 28TH, PORTLAND, OR 97232
DOCTOR'S COMPUTER COMMITTEE, 2188 SW PARK PLACE, PORTLAND, OR 97205
EUGENE 99/4A USER GROUP, P.O. BOX 11313, EUGENE, OR 97440
JACKSON AMATEUR COMPUTER SOCIETY, 2355 CAMP BAKER RD., MEDFORD, OR 97501
MICRO-CALC BUSINESS USERS GROUP, PO BOX 12039, SALEM, OR 97309
NORTHWEST SANYO ENTHUSIASTS, 5687-H SE INTERNATIONAL WAY, MILWAUKEE, OR 97222
PACIFIC NORTHWEST COMMODORE USERS GROUP, PO BOX 2310, ROSEBURG, OR 97470
PORTLAND AREA TRS-80 USER'S GROUP, PO BOX 02500, PORTLAND, OR 97202
PORTLAND COMPUTER SOCIETY, PO BOX 5494, PORTLAND, OR 97208
PORTLAND IBM PERSONAL COMPUTER CLUB, 12260 SW 124TH AVE., TIGARD, OR 97223
PORTLAND IBM PERSONAL COMPUTER CLUB, PO BOX 2068, BEAVERTON, OR 97075
THE MICRO-80 GROUP TRS-80 USERS SOCIETY, C/O BOB WALTERS, PO BOX 1472, EUGENE, OR 97440
WILLAMETTE VALLEY COLOR COMPUTER USERS, C/O BRIAN JAMES, 1850 BAILEY HILL RD., EUGENE, OR 97405

PENNSYLVANIA

ABACUS, 4209 LEVICK STREET, PHILADELPHIA, PA 19135
AIRPORT AREA COMPUTER CLUB, PO BOX 710, CORAPOLIS, PA 15108
APPLE USERS GROUP, NAVAL AIR DEVELOPMENT CTR, CODE 3013-MIKE MOCENTER, WARMINSTER, PA 18974
ATARI COMPUTER USERS OF TEMPLE UNIV., C/O GLENN SNELBECKER, 8905 PATTON RD., WYNDMOOR, PA 19118
BASIC COMPUTER CLUB, 1433 13TH AVENUE, ALTOONA, PA 16601, 814-942-9565
CAPATUG, CAPITOL AREA TRS-80 USERS GROUP, 340 LEWISBERRY RD., NEW CUMBERLAND, PA 17070, MAX WORTHINGTON
CAPITOL AREA USERS GROUP, PO BOX 673, FEDERAL SQUARE STA., HARRISBURG, PA 17108
CENTRAL PA. 99/4A USERS GROUP, THE POINT, I-83 AND UNION STREET DEPOSIT, HARRISBURG, PA 17111
CENTRE CO COMPUTER CLUB, WILLARD BLDG, UNIV PK., PA 16802
DELAWARE VALLEY COMPUTER SOCIETY, PO BOX 651, LEVITTOWN, PA 19058
ERIE APPLE CRUNCHERS, PO BOX 1575, ERIE, PA 16507
HARRISBURG PC USERS GROUP, 1195 FAIRMONT DR., HARRISBURG, PA 17112. 717-652-9097
INTERNATIONAL P.C. OWNER, INC., PO BOX 10426, PITTSBURGH, PA 15234
LEHIGH VALLEY HEATH USERS GROUP, 1425 N. BROAD ST., ALLENTOWN, PA 18104
LEHIGH 99 COMPUTER GROUP, PO BOX 4837, 1501 LEHIGH ST., ALLENTOWN, PA 18103
LVCC, PO BOX 2952, LEHIGH VALLEY, PA 18001-2952
MONROEVILLE APPLE USER GROUP, 579 CARNIVAL DR., PITTSBURGH, PA 15239
NACUG, C/O MARK KRAUSE, BOX 665, SPRING HOUSE, PA 19446
THE NATIONAL EPSON QX-10 USERS GROUP, C/O RICHARD SHOEMAKER, BOX 1076, Lemont, PA 16851
NITTANY USERS OF TEXAS INSTRUMENTS, 625 BERKSHIRE DRIVE, STATE COLLEGE, PA 16803
NORTH AMERICAN COMPUTER SOCIETY APPLE USERS GROUP, PO BOX 2129, WILKES-BARRE, PA 18700, C/O FRANCIS GEORGE
NORTH AMERICAN COMPUTER SOCIETY, ATARI USERS GROUP, PO BOX 2129, WILKES-BARRE, PA 18700, C/O FRANCIS GEORGE
PACS, 1613 LINCLON AVE., PROSPECT PARK, PA 19076, (215)583-0612
PENN-JERSEY COLOR COMPUTER CLUB, PO BOX 2742, LEHIGH VALLEY, PA 18001
PHILADELPHIA AREA COMPUTER SOCIETY, LASALLE COLLEGE, BOX 312, PHILA., PA 19141
PHILADELPHIA REGIONAL OSBORNE GROUP, PHROG, BOX 340, LAMPLIGHTER PLAZA, KULPSVILLE, PA 19443, C/O JOE GERVASE
PITTSBURGH AREA COMPUTER CLUB, 400 SMITHFIELD ST., PITTSBURGH, PA 15222
PITTSBURGH ATARI COMPUTER ENTHUSIASTS, 111 MONAHAM STREET, ALIQUIPPA, PA 10551
SANYO OF SOUTHWESTERN PENNSYLVANIA USERS' GROUP, 29 WEST MALDEN DRIVE, COAL CENTER, PA 15423
S.P.A.C.E., ATARI USER GROUP, RD 3 WHITE DOGWOOD DR., GITTERS, PA 17319
SPACE, C/O DENSLOW, 14 PHEASENT CT., MECH, PA 17055
T.I. 99/4A, PITTSBURGH USER'S GROUP, BOX 18124, PITTSBURGH, PA 15236
SUSQUEHANNA VALLEY USERS GROUP, ATARI, COMMODORE, & TI 99/4A, C/O RAY KROHN, PRESIDENT, P.O. 5 BOX 145, DANVILLE, PA 17821
THE YORK AREA 99'ERS USERS GROUP, C/O ED GEISLER, 4385 BRAIRWOOD COURT, YORK, PA 17404
COCO USERS OF PHILADELPHIA P.O. BOX 14330, PHILADELPHIA, PA 19115
TI-99/4A PITTSBURGH USERS GROUP, BOX 18124, PITTSBURGH, PA 15236
TRS-80 USERS GROUP OF DELAWARE, 1109 MADISON AVE., PROSPECT PART, PA 19075
TUG-DC, C/O GARY DITLLIO, 1109 MADISON AVE., PROSPECT PARK, PA 19076
VALLEY ATARI COMPUTER CLUB, RD 2 COLEMAN DR., BEAVER, PA 15009
VALLEY FORGE TRS-80 USERS GROUP, 1000 VALLEY FORGE CIRCLE, KING OF PRUSSIA, PA 19406
WYOMING VALLEY COMPUTER CLUB, 302 WYOMING AVE., KINGSTON, PA 18704

RHODE ISLAND

THE COMPUTER CLUB, 49 DESANO DR., NARRAGANSETT, RI 02882
RHODE ISLAND COMPUTER HOBBYISTS, PO BOX 599, BRISTOL, RI 02809
NORTH EASTERN 99'ERS, 76 HERSCHEL STREET, PROVIDENCE, RI 02909

SOUTH CAROLINA

CHARLESTON COMPUTER SOCIETY, PO BOX 5264, N. CHARLESTON, SC 29406
COMMODORE UPSTATE USERS, P.O. BOX 785, EASLEY, SC 29641 (803) 859-5435
COMMODORE USERS SOCIETY OF GREENVILLE, C/O HORIZON RECORDS-HOME COMPUTERS, 347 S. PLEASOUTBURG DR., GRENVILLE, SC 29607
GREENVILLE APPLE USER GROUP, PO BOX 5131, GREENVILLE, SC 29106
GREENVILLE AREA HOME COMPUTER CLUB, C/O CHARLES E. GARDNER, 317 ELAINE AVE., TAYLORS, SC 29687 (803)244-3243
LORDS OF BASIC USERS GROUP, C/O ROB WHISONANT, PO BOX 459, LANDSON, SC 29456
MIDLANDS 80 COMPUTER CLUB, PO BOX 7594, COLUMBIA, SC 29202
NONAME APPLE CLUB, C/O JAMES SUMNER, 80 DUNNEMANN AVE., CHARLESTON, SC 29403
PIEDMONT 99'ers USERS GROUP, PO BOX 5921, GREENVILLE, S.C. 29606
THE COMPUTERNIKS, C/O USC CC BOOK STORE, PO BOX 1954, CONWAY, SC 29526

SOUTH DAKOTA

SIOUX FALLS AREA HUG, C/O LORIN DOBSON, 2001 S. SPRING AVE., SIOUX FALLS, SD 57105
SIOUXLAND 99ERS UG, 2310 S. COVELL, SIOUX FALLS, SD 57105

TENNESSEE

APPLE SOFTWARE TURNOVER, PO BOX 716, FAYETTEVILLE, TN 37334
ATHENS 99/4A COMPUTER USERS GROUP, PO BOX 309, ATHENS, TN 37303
CHATTANOOGA USERS GROUP (CHUG), PO BOX 136, HIXSON, N 37343, C/O EARL CONWAY
EAST TENNESSEE CENTRAL HEATH USERS GROUP, 7608 LUSCOMBE, KNOXVILLE, TN 37919, C/O WALTER SCOTT, 615-690-3864
ET 64 USERS GROUP, PO BOX 495, KNOXVILLE, TN 37901
HOLSTON VALLEY USERS GROUP, 310 WILLOW ST., MT. CARMEL, TN 37642
K-TOWN 99/4A USERS GROUP, 3506 GARDEN DRIVE, KNOXVILLE, TN 37918, (615)687-8869
MEMPHIS AREA IBM-PC USERS GROUP, PO BOX 241756, MEMPHIS, TN 38124, C/O PETER VERMILYE
MEMPHIS COMMODORE USERS CLUB, P.O. BOX 38095, BARTLETT, TN 38134-0095
MID-SOUTH 99 USERS GROUP, P.O. BOX 38522, GERMANTOWN, TN 38138
MUSIC CITY 99'ER USERS GROUP, PO BOX 4072, MADISON, TN 37116
NASHVILLE COMMODORE USERS GROUP, PO BOX 121282, NASHVILLE, TN 37212, C/O DAVE RUSHING OR DALLAS DENNY
TUG (TIMEX USERS GROUP), 1501 - B COMPTON AVE., NASHVILLE, TN 37212

TEXAS

AACE ATR-8000 SPECIAL INTEREST GROUP, 9401 MOUNTAIN QUAIL ROAD, AUSTIN, TX. 78758
ABILENE TIMEX SINCLAIR UG C/O CHRIS NYSTROM, 609 EN 18th, ABILENE, TX 79601
ALAMO KAYPRO USERS'GROUP, P.O. BOX 47728, SAN ANTONIO, TX 78265 512-496-6300
ALAMO PC ORGANIZATION, PO BOX 16433, SAN ANTONIO, TX 78216
AMATEUR RADIO CLUB, PO BOX 4391, WICHITA FALLS, TX 76308
APPLE PI, C/O CALY FRANCELL, 2105 ANDREWS HWY., ODESSA, TX 79761
AUSTIN ATARI COMPUTER ENTHUSIASTS, 8207 BRIARWOOD LANE, AUSTIN, TX 78758
AUSTIN TRS-80 USERS GROUP, PO BOX 43422, AUSTIN, TX 78745
BASIC SOCIETY—IBM USERS GROUP, BOX 815099, DALLAS, TX 75281
BIG COUNTRY HOME COMPUTER USER GROUP, PO BOX 2114, ABILENE, TEXAS 79604
CENTRAL TX COMPUTER, 14 LAVACA, AUSTIN, TX 78701
CENTRAL TEXAS COMPUTER ASSOCIATION, PO BOX 4391, WICHITA FALLS, TX 76308
CENTRAL TEXAS 99/4A USERS GROUP, PO BOX 3026, AUSTIN, TX 78764
CLEARWATER OSBORNE GROUP, C/O MAYNARD HUNTLEY, PO BOX 57613, WEBSTER, TX 77598
CLUB 1802, PO BOX 985, DICKINSON, TX 77539
COMMODORE (HOUSTON) USERS GROUP, C/O JOHN WALKER, EDITOR OF NEWSLETTER, 8738 WILDFOREST, HOUSTON, TX 77088
COMP HOBBYIST GROUP, UTA, ARLINGTON, TX 76109
COMPUGUILD TRS-80 GROUP, 2211 S. LIPSCOMB, AMARILLO, TX 79109
CORPUS CHRISTI COMPUTER CLUB, 801 ORLEANS, CORPUS CHRISTI, TX 78418
CORPUS CHRISTI TRS-80 USERS GROUP, 6214 HIDDEN COVE, CIRPUS CHRISTI, TX 78412
D/FW IBM USERS, 1913 DALWORTH ST., GRAND PRAIRIE, TX 75050
DAL-ACE, 916 E. BERKELEY, RICHARDSON, TX 75081
DALLAS-AGGIE COMMODORE 64 CLUB, 2914 POPLAR TRAIL, GARLAND, TX 75042, (214) 494-0839
DALLAS APPLE CORPS, PO BOX 5537, RICHARDSON, TX 75080
DALLAS COUNTY COMMODORE CLUB, 1913 DALWORTH STREET, GRAND PRAIRIE, TX 75050
DALLAS/FORT WORTH METROPLEX 68XX USER'S GROUP, P.O. BOX 6809, DENTON, TX 76203
DALTRUG, TRS-80 USERS GROUP, INC., PO BOX 400472, DALLAS, TX 75240
DYNASTY SMART-ALEC USER'S GROUP, (S.M.U.G.), C/O RICHARD ZERWICK, 15033 KIMBERLY LANE, HOUSTON, TX 77079, SOURCE ID #TCW003
EAST TEXAS EAGLE USERS, 1809 BELL, LONGVIEW, TX 75602
EL PASO COMP GRP, ELECTRONICS BLDG, EL PASO, TX 79901
FORT WORTH APPLE USERS GROUP, BOX 13903, ARLINGTON, TX 76013 C/O GARTH CLOSE
GROUP BUY USERS, PO BOX 830119, RICHARDSON, TX 75083
GROUP 80, DAVIS HALL, ARLINGTON, TX 76109
HOT APPLE PIE, PO BOX 517, HEITT, TX 76643
HUGTIBBS TI99/4A 2401 CLEAREMONT, ST. JOHN'S SCHOOL, HOUSTON, TX
INTERNATIONAL COLOR COMPUTER CLUB, 2101EAST MAIN STREET, HENDERSON, TX 75652
KAYPRO CLUB OF AUSTIN, PO BOX 9791, AUSTIN, TX 78766
LUBBOCK IBM PC SIG, PO BOX 98117, LUBBOCK, TX 79499
MCTRUG, C/O ROBBIE G. YODER, 5413 Rita Kay Lane, Ft. Worth, TX 76119
METROPLEX CP/M INTEREST GROUP, P.O. BOX 863909, PLANO, TX 75086
MIDLAND MICROCOMPUTER USERS, PO BOX 50246, MIDLAND, TX 79710, C/O LONNIE YEE
METROPPLEX CP/M INTEREST GROUP, C/O PO BOX 863909, PLANO, TX 75086
The NASACOM 64 COMMODORE CLUB, JOHNSON MANNED SPACE CENTER, MEDIA BUILDING II, HOUSTON, TX
PCUG (PERSONAL COMPUTER USERS GROUP), 1134 LINDA LEE, SAN ANGELO, TX 76905
PERMIAN BASIN AMATEUR COMPUTER GROUP, C/O JOHN RABENALDT, ECTOR COUNTY SCHOOL DISTRICT, BOX 3912, ODESSA, TX 79760
PERMIAN PC COMPUTER USERS GROUP, ODESSA COLLEGE, EDP DEPARTMENT CHARIMAN, ODESSA, TX 79760
RANDOLPH AREA ATARI USERS' GROUP, PO BOX 2611, UNIVERSAL CITY, TX 78148
RIVER CITY APPLE CORPS., PO BOX 13449, AUSTIN, TX 78711
SAN ANGELO APPLE USERS GROUP S.A.A.G., 1322 GREGORY DR., SAN ANGELO, TX 76905
SUN CITY 99/4A COMPUTER CLUB, PO BOX 6966, EL PASO, TX 79906
SUN METRO ATARI USERS GROUP (SMAUG), #516, 9455 VISCOUNT BLVD., EL PASO, TX 79925
TAMU UC CLUB, POB M 9, AGGIELAND, STATION, TX 77664
TEXAS SANYO USERS GROUP, C/O 21ST CENTURY CONCEPTS, P.O. BOX 741576, HOUSTON, TX 77274-1576
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KnowledgeMan
Continued from page 60

actions with data base and graphics."

Available initially under the PCDOS operating system for the 3Com local area network, the new release allows multiple users to share common data resources, such as tables or records, and peripherals (printers, etc.) on a local area network. It prevents inconsistent modifications of data for individual records, groups of records, and for all records in a shared table. Similar protection is provided for shared spreadsheets, text files, graphics, and other files.

In addition to its purely network-related aspects, the LAN version of KnowledgeMan offers all of the package's standard features for integrated knowledge management - third-generation spreadsheet, statistics, ad hoc questions & answer facility, forms and screen management, a structured programming language, and a relational data base manager, with integrated options for color graphics, text processing, forms painting, and mouse handling.

Specific multi-user capabilities of the LAN version include:

1. The hold:drop advisory technique for protecting data integrity
2. Protection for shared records, tables, etc.
3. User control over the duration of hold attempts
4. Automatic hold processing during table browsing
5. Automatic index updating for shared tables
6. Automatic suspension/resumption of shared table modifications
7. Choice between shared and local status for each table
8. Ability to limit read and/or write access of a shared table to a desired sub-group of users
9. Ability to change an already-created table's status
10. Compatibility with already-created tables defined via the standard KnowledgeMan package

Dr. Koehler reports that KnowledgeMan is widely regarded as the most powerful and flexible integrated software package available. "It is used throughout major corporations and small businesses as well as by OEMs for both simple and complex applications. With its comprehensive on-line HELP facility, KnowledgeMan allows novices to begin using its facilities productively after only an hour or two. KnowledgeMan also provides full-scale security provisions including passwords read/write controls and data encryption, which are vital to the success of many businesses."

KnowledgeMan, recently selected by Norway for its schools and universities, has become the preferred tool for a diversity of applications, ranging from tracking financial information, budget consolidation and medical systems to MRP, monitoring oil pipeline quality and portfolio analysis.

Micro Data Base Systems is the world leader in knowledge management software for microcomputers. In addition to KnowledgeMan, MDBS is the creator of MDBS III, the post-relational, extended-network data base management system for microcomputers. The company's Consulting & Applications group, based in Dallas, assists clients world-wide in designing and implementing application systems with MDBS software products.

The price for the KnowledgeMan LAN version (up to 10 users) is $1,495. For more information contact Micro Data Base Systems, Inc., P.O. Box 248, Lafayette, IN, (317)-463-2581.

Mention that you read it in the **Computer Shopper.**●

Program 2, The Correspondent
continued from page 114

```
1 REM ********************************************************
2 REM * CARDSORT - EXAMPLE REPLACING CMD"O" WITH QUICKSORT *
3 REM * A$=LIST TO BE SORTED   NZ=# OF VALUES IN A$        *
4 REM * Z$=COMPARED TO A$  STZ=STACK TO HOLD POINTERS      *
5 REM * AZ=VALUE OF TOP OF SEGMENT  B2Z=VALUE OF BOTTOM    *
6 REM * KZ=SORT FINISHED WHEN ZERO  I2Z=STACK POINTER      *
7 REM * UZ=POINTER TO TOP    LZ=POINTER TO BOTTOM          *
8 REM ********************************************************
9 CLEAR 1000:CLS:PRINT:PRINT"The Correspondent 1.0          (C) 1985 Reinhardt & Burckhardt":PRINT STRING$(63,CHR$(131))
10 PRINT@155,"CARDSORT":POKE 16916,4:CLS:PRINT@896,STRING$(63,CHR$(131))
8000 CLEAR 28000 '------======SORT & PRINT ENTIRE FILE======------
8005 INPUT"                    (P)OSTCARDS OR (L)ABELS";ZZ$
8006 IF ZZ$="P" THEN PZ=21 ELSE PZ=3
8010 CLS:GOSUB 10000
8020 PRINT@279,"SORTER IS WORKING"
8030 DIMSTZ(700):DIMA$(700),BZ(700)
8040 FOR I=1 TO LOF(1)
8050 GET#1,I
8060 G$=AA$+"   "+STR$(I):A$(I)=G$
8065 A$(I)=G$
8066 NEXT I:CLOSE
8075 CLS:PRINT@277,"PRINTER AND CARDS READY?"
8076 PRINT@979,"PRESS (SPACEBAR) TO CONTINUE";
8077 PR$=INKEY$:IF PR$="" THEN 8077
8080 NZ=I:GOSUB 16000
8087 FOR I=1 TO NZ
8088 BZ(I)=VAL(RIGHT$(A$(I),3))
8089 NEXT I:GOSUB 10000:CLS
8090 FOR I=2 TO NZ
8095 PRINT@283,"PRINTING"
8100 IN=BZ(I)
8110 GET#1,IN
8120 IF LEFT$(AA$,3)="ZZZ" THEN 9500
8130 B1=1
8140 A$=MID$(AA$,B1,1):IF A$="," THEN 8160
8150 B1=B1+1:GOTO 8140
8160 B2=LEN(AA$):B2=B2-B1-1:A1$=RIGHT$(AA$,B2):A2$=LEFT$(AA$,B1-1)
8170 B3=35
8180 B3=B3-1:A1$=LEFT$(A1$,B3)
8190 IF RIGHT$(A1$,1)<>" " THEN 8200 ELSE 8180
8200 LPRINTTAB(20) A1$;" ";A2$:LPRINTTAB(20) BA$:LPRINTTAB(20) CA$;TAB(36)DA$
8210 FOR Z=1 TO PZ:LPRINT:NEXT Z
8220 NEXT I:CLOSE
9510 STOP
10000 OPEN "R",1,"ADDRESS/DAT",153
10010 FIELD #1,34 AS AA$,41 AS BA$,15 AS CA$,7 AS DA$,3 AS EA$,8 AS FA$,5 AS GA$,40 AS HA$
10020 RETURN
15999 '------======QUICKSORT ROUTINE======------
16000 KZ=0:I2Z=0
16010 STZ(I2Z+1)=1:STZ(I2Z+2)=NZ
16020 KZ=KZ+1
16030 IF KZ=0 THEN RETURN
16040 CLS:PRINT@347,"PATIENCE":KZ=KZ-1:I2Z=KZ+KZ
16050 AZ=STZ(I2Z+1):B2Z=STZ(I2Z+2)
16060 Z$=A$(AZ):UZ=AZ:LZ=B2Z+1
16070 LZ=LZ-1
16080 IF LZ=UZ THEN 16130
16090 IF Z$<=A$(LZ) THEN 16070 ELSE A$(UZ)=A$(LZ)
16100 UZ=UZ+1
16110 IF LZ=UZ THEN 16130
16120 IF Z$>=A$(UZ) THEN 16100 ELSE A$(LZ)=A$(UZ):GOTO 16070
16130 A$(UZ)=Z$
16140 IF B2Z-UZ>=2 THEN I2Z=KZ+KZ:STZ(I2Z+1)=UZ+1:STZ(I2Z+2)=B2Z:KZ=KZ+1
16150 IF LZ-AZ>=2 THEN I2Z=KZ+KZ:STZ(I2Z+1)=AZ:STZ(I2Z+2)=LZ-1:KZ=KZ+1
16160 GOTO 16030
```

Maynard Introduces 20 MB File-By-File Backup System

Maynard Electronics announced the MaynStream 20, a portable IBM PC compatible tape backup system that can back up an entire hard drive in just three minutes, file-by-file, on 20 MB cassette cartridges. The easy-to-use system runs off simple keyboard commands; no complicated instructions are needed.

The MaynStream 20's file-by-file backup technology allows it to restore backed up data to a different disk if the source disk fails. In most cases with image mode, (the system most competitors use) this isn't possible and data can be lost. Another feature of the MaynStream 20 is its file-splitting capability. This means that when one cassette is full, backup can be continued on the next one.

The fully portable MaynStream 20 is easily connected and disconnected from system to system through the use of a Quick-Release Cable. A Controller Interface Card or Module is installed in each system the user wishes to back up. The Controller Interface Card plugs directly into the short card slot of a PC. The Module plugs onto one of Maynard's SandStar series cards (Hard Drive Controller Card, Floppy Drive Controller Card, or Multifunction Card) without taking up an additional slot.

When purchased as a system, the MaynStream 20 includes the MaynStream 20 System Unit, Controller Interface Card or Module, Quick-Release Cable, Data Cassette Cartridge, Software, and manual and is backed up by Maynard's industry-leading one year warranty and Technical Support Team. The system retails for $1595. Additional Controller Interface Cards or Modules for other computers, a durable carrying case, and Data Cassette Cartridges are available separately. The modules and cards retail for $195.

For further information contact Maynard Electronics at 305-331-6402.

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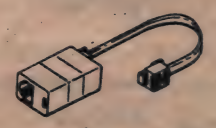

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Portable Roundup
Continued from page 22

Centronics parallel and one RS232C serial port. There are two expansion slots for half length PS cards. The 675 is compatible with all MSDOS software that is configured for Sanyo computers with 360K drives including many IBM PC programs. It sells for $1,795 suggested price and has a 90 day warranty, extendable to two full years.

Sanyo 775 Color Portable

The Sanyo 775 Color Portable (see fig 8.) has been improved with the addition of a switchable clock rate allowing it to run at the standard IBM rate of 4.7MHz or at 8MHz. The faster rate will allow the processor to run programs like Lotus 1,2,3 much faster. In addition the 775 will also support Pc compatible hard disk drives. the 775 has a 9" color CRT, two 360K floppy disk drives.

For information: Sanyo, 51 Joseph St., Moonachie, NJ 07074, 201-440-9300. ●

Figure 7 Sanyo 675 Portable

Figure 8 Sanyo 775 Color Portable

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New Procedure For Registering Your Board

Listings are good for three months. After that period they will be purged unless we receive a Post Card or Letter saying the board is active. In addition, any reader who contacts a board can confirm that it is active, but it is up to the SYSOP to keep us current.

We thank you for your cooperation. We will keep the listings on a Data Base so please send in your notices every three months.

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RBBS SOUTHERN MICRO 305-625-3181 *24
SCAUG BBS Merritt Island, FL 305-453-6998
SPACE SHUTTLE BBS (SSBBS) Satellite Beach, FL 305-777-4714 *24
TBBS Orlando, FL 305-644-8327 *24
TECH-80 305-266-1032 *24
THE BYTE SHOP 305-261-3639, Networks Not BBS
TIBBS West Palm, FL 305-793-8050
TRADE 80 Ft. Lauderdale, FL 305-525-1192
TRADE 80 of Miami 305-947-7930 *24
TRADE 80 Pompano Bch. 305-426-8080 *24
TREASURE QUEST Vero Beach, FL 305-562-1627 *24
UNICORN, AMIS BBS Palm Bay, FL 305-729-9575
YBBS The Heath Bar 305-940-8795 *24
NOVA Merritt Island, FL 305-453-0079 *24
COMNET-64 (COMMODORE) Tamarac, FL 305-726-4390 *24
THE PINNACLE BBS Hollywood, FL 305-922-4440 *24
NET-WORKS CAVE HOLLYWOOD, FL 305-961-8685 *24
PET BBSSe Wyoming PUG 307-637-6045 *24
THE EXPRESS East Peoria, IL 309-699-6359 noon-11pm CST
NET-WORKS MAGIE Galesburg, IL 309-342-7178
ABBS Chicago, IL 312-743-3153
ABBS Gamemaster, Chicago, IL 312-475-4884 *24
ABBS Lincolnwood, IL 312-764-6502
ABBS Rogers Park, Chicago, IL 312-973-2227
AMIS Bellwood, IL 312-544-7228
AMIS Chicago, IL 312-789-3610 *24
AMIS Lombard, IL 312-620-6441
The BASIC BBS Aurora, IL 312-896-9628 3pm-11pm
CBBS Chicago, IL 312-545-8086 *24
CBBS Chicago, IL 312-876-0974
CBBS Dolton, IL 312-849-1132
CHICAGO GREEN MACHINE 312-622-4442
CO-OP BBS Arlington Heights, IL 312-228-1495
CP/M Chicago, IL 312-326-4392
CP/M Chicago, IL 312-338-8827
CP/M Chicago, IL 312-537-7888
CP/M Chicago, IL 312-861-1797
CP/M Downers Grove, IL 312-852-1305
CP/M Glen Ellyn 312-469-2597
DIAL-YOUR-MATCH -39 312-243-1046
HCOM Chicago, IL 312-267-2066
HP1 Palantine, IL 312-397-8308
MCMS C.AM.S. Chicago, IL 312-927-1020 *24
MCMS Hanover Park, IL 312-289-7619
MCMS L.A.M.S. Round Lake, IL 312-740-9128
MCMS Waco Hotline, Schaumburg, IL 312-351-4374 *24
MCMS Wheaton, IL 312-462-7560
NESSY Chicago, IL 312-773-3308
NET Arlington Heights, IL 312-392-2403
NET 3 Arlington Heights, IL 312-398-0970
NET 3 Chicago, IL 312-545-5866
NET Chicago, IL 312-685-9573
NET Chicago, IL 312-278-7261
NET Lombard, IL 312-627-5138
NET Wheaton, IL 312-260-0748
NET Skokie, IL 312-674-9246
NET-WORKS Chipmunk, Hinsdale, IL 312-323-3741 *24
NET-WORKS North Parks, Chicago, IL 312-745-0924
OCCCS #2 Wheaton, IL 312-588-7917
OT Berwyn, IL 312-795-0871
PBBS Co-Operative Comp. Palatine, IL 312-359-9450 *24
PCM Midlothian, IL 312-396-1022
PET BBS COMMODORE Chicago, IL 312-397-0871 *24
PMS Chicago Public Library 312-235-3200
PMS Chicago, IL 312-373-8057 *24
PMS I.A.C. Lake Forest, IL 312-295-3926 *24
RIPCO 1200/300 BAUD, Chicago, IL 312-528-5020 *24
RCP/M AIMS Hinsdale, IL 312-789-0499 *24
RCP/M IBM PC Niles, IL 312-259-8086
RCP/M Logan Square, Chicago, IL 312-252-2136
RCP/M NEI; Chicago, IL 312-949-6189
TBBS Chicago, IL 312-445-4545
TIBB Oak Park, IL 312-848-3669
UNIVERSITY CONFERENCE INFORMATION NET Chicago, IL 312-942-0089
WAUKEGAN PUBLIC LIBRARY SYSTEM BBS Waukegan, IL 312-623-2226
ABBS Michigan Apple-Fone Southfield, MI 313-357-1422
AMIS A.R.C.A.D.E. Sterling Hgts., MI 313-978-8087 *24
AMIS M.A.C.E. Detroit, MI 313-368-2064 *24
AMIS MACE, Michigan 313-274-3940
AMIS Michigan 313-544-0885
APPLE-GRAM 313-292-0389
BBS Metro Detroit, MI 313-455-4277
BULLET-80 Waterford, MI 313-683-5076 *24
CBM-U Commodore Detroit, MI 313-273-9551 *24
CCCC BBS Canton, MI 313-981-5061
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DIAL-YOUR-MATCH -37 313-736-1398
MC CBBS 313-243-4561 *24
RCP/M Detroit, MI 313-584-1044
RCP/M MCBBS Keith Peterson, Royal Oak, MI 313-759-6569
RCP/M MCBBS TCBBS Dearborn, MI 313-846-6127 *24
RCP/M RBBS Pontiac, MI 313-338-8505
RCP/M RBBS Southfield, MI 313-559-5326 *24
RCP/M RBBS Westland, MI 313-729-1905
SYSTEMS PLUS Flint, MI 313-742-6932
TIBBS Detroit, MI 313-288-0530
TIBBS Oak Park, MI 313-544-7788
TIBBS Warren, MI 313-751-1119
TREASURE ISLAND 313-547-7903
TWILIGHT PHONE 313 775-1649 *24
WESTSIDE DOWNLOAD Detroit, MI 313-533-0254
ABBS Century Next Computers, ST. Louis, MO 314-442-6502
ABBS St. Louis, MO 314-838-7784 *24
AMIS ComputerCave MO 314-432-7034
MIDWEST St. Louis, MO 314-227-7120
NET-WORKS Computer Station, St. Louis, MO 314-432-7120
PET BBS Commodore Comm. Lade, St. Louis, MO 314-625-4576

FORUM-80 Wichita, KS 316-682-2113 *24
TIBBS Wichita, KS 316-681-3167
WOLF'S DEN BBS Wichita, KS 316-838-7260 *24
THE ANDROMEDA STRAIN Wichita, KS 316-722-9526 *24
BUSINESS PERSONS' LUNCH Wichita, KS 316-685-1205
GREAT INLAND SEA BBS 316-685-1188 6pm-8am C.S.W. 316-942-8746
OMEGA BBS Wichita, KS 316-685-8202 *24
TIBBS Wichita, KS 316-681-3167 *24
MOUSE EXCHANGE Wichita, KS 316-685-1190
COMMODORE BBS Wichita, KS 316-683-7848 *24
PANTHER I Wichita, KS 316-687-1268
RIVCO CATALOS Wichita, KS 316-264-8258 *24
SPECTRUM Wichita, KS 316-945-0882 *24
TBBS Wichita, KS 316-777-0402
UNION STATION BBS Wichita, KS 316-262-0819
W.O.P.A. Wichita, KS 316-683-0160
THE WOODSHED Wichita, KS 316-524-9069
The COCO BULLET Indianapolis, IN 317-291-7827 *24
PMS Indianapolis, IN 317-787-5486
PMS SOFTWARE EXCHANGE Indianapolis, IN 317-251-7796 8:30pm-10am
CBM-U COMMODORE Crowley, LA 318-783-2647 *24
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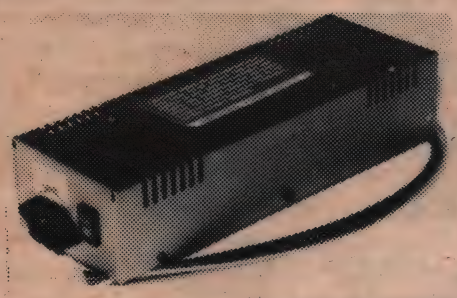

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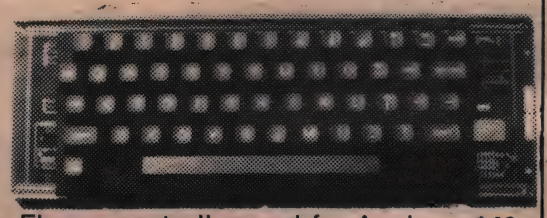

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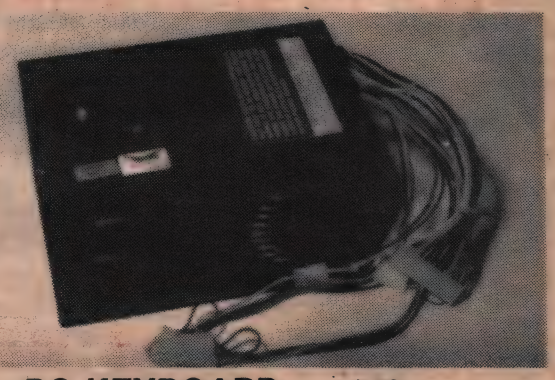

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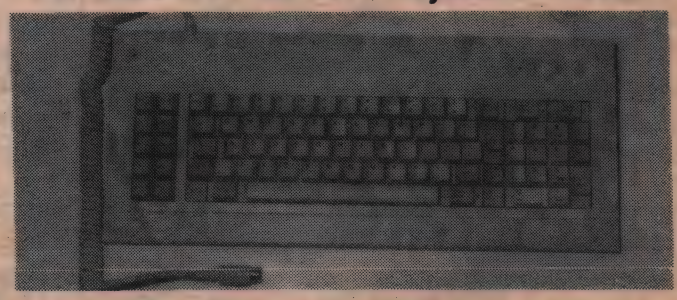

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SOFTWARE SHOPPING LIST

NAME: SUPER*CAT
TYPE: catalog program
COMPUTER: IBM PC/XT/jr/AT computers and compatibles
DESCRIPTION: Designed to create a catalog for a library of books, and can also be adapted for other collections such as records, tapes, etc. The functions of this program include the following: Adding books to the catalog, deleting (or undeleting) books, editing the data for any book, printing catalog cards, in various formats, searching for and displaying or printing information in 11 selectable formats, and sorting the catalog information for any type data.
PUBLISHER: Zephyr Services, 306 South Homewood Avenue, Pittsburgh, PA, 15208
COST: $49.95 (+ $2.00 shipping).

NAME: PAINT 'N PRINT
TYPE: graphics cartridge program
COMPUTER: TI-99/4A
DESCRIPTION: The ability to save pictures to either cassette or disk, and magnify sections of the picture to gain control over each tiny pixel for fine resolution work are two of the many features of this program. The program gets its name from its ability to print out works of art in full living color when using a color printer.
PUBLISHER: Navarone Industries, Inc., 19968 El Ray Lane, Sonora, CA 95370.
COST: $39.95

NAME: GRA-FIT
TYPE: graphics program
COMPUTER: IBM PC and Hewlett-Packard 7470A/7475A plotter
DESCRIPTION: GRA-FIT allows the user complete control over the graph layout: pen selection, axis dimensions and labelling, titles, etc. A great deal of flexibility is afforded the user in plotting - multiple curves may be plotted on one graph and multiple graphs may be plotted on one sheet of paper, in horizontal or vertical format, and in any location on the paper.
PUBLISHER: JAYAR Systems, P.O. Box 2885, Station A, Audbury, Ontario, Canada, P3A 5J3
COST: $95.00

NAME: OKI FONT-DO
TYPE: printer utility
COMPUTER: MS-PC/DOS computers (Sanyo, IBM and Compatibles
DESCRIPTION: This utility can work with any word processor or language on any MS/PC-DOS computer that can read a 5¼" SSDD diskette. Can be mixed with the printer's standard font or used alone. Also comes with a Shell Program for your own creations. With Oki Font-Do you can now include graphic representations in your word-processing text.
PUBLISHER: Wolfsangel Enterprises, Maple Avenue, Building Y3-3, Hatfield, PA 19440.
COST: $9.95

NAME: GEARS: STRATEGIES IN PROBLEM SOLVING
TYPE: educational software program
COMPUTER: Apple II series
DESCRIPTION: The objective of this new software program is to have students gather information and make predictions based on their data; to encourage students to discover mathematical formulas and build models that will help them make predictions. The grade levels are from 4 years to adult.
PUBLISHER: Sunburst Communications, Inc., 39 Washington Avenue, Pleasantville, NY, 10570, 914-769-5030
COST: $55.00 (includes the diskette, backup and teacher's guide).

NAME: WRITE 'N SPELL
TYPE: Word processing system
COMPUTER: IBM-PC, XT, AT, Jr and compatibles
DESCRIPTION: Easy to learn and use word processor containing a fully integrated 90,000 word dictionary. The built-in spelling function not only checks, but also automatically corrects your spelling. In addition, you may add over 10,000 of your own words to customize your dictionary. Also features state of the art "Pull Down Option Windows," making any feature only a keystroke away.
PUBLISHER: Professional Software, Inc., 51 Fremont Street, Needham, MA 02194, 617-444-5224
COST: $149

NAME: DISKIT
TYPE: utility for examining and changing the contents of a disk
COMPUTER: PC/MS-DOS
DESCRIPTION: Easy to use utility with simple menus for all its functions. It is also quite powerful, permitting the user not only to look at the contents, but also to change what's there. It also enables the programmer to make sure the data their program is writing is in the right format, or to check their input data to make sure it's in the right format their program anticipates.
PUBLISHER: Lifesaver Systems, 1550 California Street, Suite 275, San Francisco, CA, 94109, 415-868-2603
COST: $25 licensing fee

NAME: LABLMAKER-PC
TYPE: five type style label format
COMPUTER: IBM-PC/XT/AT/Jr and compatible systems
DESCRIPTION: This program was designed for user convenience - a quick and easy way to print labels. Simplified keyboard entry, line-by-line, allows the user to compose, layout, line-up, correct and even test print while previewing the label on the CRT. One hundred ready-to-print entries can be stored on each diskette.
PUBLISHER: ETS Center, 35026-A South Turtle, P.O. Box 651, Willoughby, OH, 44094, 216-946-8479.
COST: $49.00

NAME: ABL GENERAL LEDGER
TYPE: Accounting program
COMPUTER: IBM PC or compatible, many CP/M machines
DESCRIPTION: Fully integrated menu driven GL with a check register for single or multiple checking accounts. Flexible account/department numbers with no restrictions on assigning value, sequence, or range. Full cursor control and the keys can be customized to suit you or machine. Reports include trial balance, income statement, balance sheet, listings of chart of accounts, journal, and check register. Works on either a hard or floppy disk system. Interfaces with all other ABL Accounting Series programs. Trial disk and manual available for $15 refundable within 14 days or applied to purchase.
PUBLISHER: ABL Software, 14651 Fairway, Livonia, MI, 48154
COST: $165.00.

NAME: SPREADLINK/CASH FLOW
TYPE: software module
COMPUTER: Lotus 1-2-3 and MS/DOS or PC/DOS
DESCRIPTION: This software module extracts the specific billing, aged collection, payment, receivables and other cash flow data from Medicalis/Dentalis to provide numerous graphs, tables and comparison tools. The software module is accompanied by the educational Art of Practice Management - Cash Flow booklet.
PUBLISHER: Articulate Publications, Inc., 402 North Larchmont Blvd., Los Angeles, CA, 90004, (213)-871-1350
COST: $100.00

NAME: CRAMAPPLE 512K
TYPE: expansion memory board
COMPUTER: Apple II, II+, IIe
DESCRIPTION: This plug-in compatible board will increase the computer's working memory from its present 48K or 64K to over half a megabyte of available RAM memory without breaking a budget.
PUBLISHER: BFM Products, P.O. Box 942, Felton, CA 95018, 408-263-9378
COST: $349.00

NAME: OPEN FOR BUSINESS I
TYPE: integrated accounting package
COMPUTER: IBM-PC and PC-compatibles
DESCRIPTION: This accounting package consists of three modules: accounts receivable, general ledger, and cash disbursements. This package is designed for cash based accounting and runs on either floppy or hard-disk computers. It is aimed at sole proprietorships and businesses with needs typically met by manual accounting systems.
PUBLISHER: Open Systems, Inc., 6477 City West Parkway, Eden Prairie, MN 55344 (612)829-0011
COST: $595.00

NAME: BOTTOMLINE GRAF
TYPE: graphics illustration program
COMPUTER: operates on a personal computer compatible with the PC DOS or MS-DOS operating systems.
DESCRIPTION: This program was designed to be an inexpensive, easy-to-use utility package for producing charts and graphs of numerical data. It produces graphic presentations in pie,

SOFTWARE SHOPPING LIST CONTINUED FROM PAGE 192

bar and line formats. The program provides up to 12 intervals on the X-axis and Y-axis along with clustered or stacked bar graphs, multiple line graphs and combined charts.
PUBLISHER: Venture Software, 16200 Ventura Blvd., Encino, CA, 91436.
COST: $99.00

NAME: INSURANCE PRO
TYPE: electronic desktop manager
COMPUTER: personal computers compatible with MS-DOS and PC/DOS operating systems
DESCRIPTION: Features of this program include: clients/prospects profiles, client and product sales analysis, renewal alert, future itineraries, and scheduling. Other basic features are the carrier analysis, commission report, expense tracking, appointment calendar, mail merge and label/envelope printing.
PUBLISHER: Venture Software, 16200 Ventura Blvd., Encino, CA, 91436.
COST: $395.00

NAME: FINANCIAL PARTNER
TYPE: bookkeeping system
COMPUTER: Commodore 64
DESCRIPTION: This system saves the user time by eliminating the need for tedious, manual record keeping with an easy-to-follow program that puts the user in command. Features of this system include automatic maintenance of checkbook balance and easy reconciliation with bank statements. With the record retrieval feature, Financial Partner enables the user to search for information such as payee names, dates, account numbers, transaction numbers, and check numbers. This program is capable of printing checks, and addressing labels and envelopes.
PUBLISHER: Practical Programs, Inc., P.O. Box 93104/625 N. Milwaukee Street, Milwaukee, WI, 53203, 414-278-0829.
COST: $74.95

NAME: QUADSCREEN
TYPE: high-resolution, bit-mapped "big screen" monitor for IBM PC
COMPUTER: IBM PC or XT
DESCRIPTION: This 17-inch monochrome screen displays 10,240 characters. Has dot addressibility. Super spreadsheet and split-screen functions offer two full screens of memory (64K each). Has full IBM PC DOS/BIOS compatibility and set determination. Is compatible with many CAD/CAM software programs. Software, cable and flicker-free display controller board are included.
PUBLISHER: Quadram Corporation, 4355 International Blvd., Norcross, GA, 30093, (404)-923-6666
COST: $1,995

NAME: TRSTOMS
TYPE: conversion program
COMPUTER: TRS-80 models
DESCRIPTION: TRSTOMS consists of a Basic program that operates on the MSDOS machine. The program changes the content and syntax of most TRSDOS Basic instruction lines to conform to the different requirements of PC Basic or other MSDOS Basic, such as GW Basic. It prints a hardcopy conversion report which indicates the conversions made and also even flags potential problems that cannot be automatically converted.
PUBLISHER: Ramona Enterprises, Inc., 1087 Taft Street, Rockville, MD 20850, (301)-340-8100.
PRICE: $50.00

NAME: BROWN BAG SOFTWARE
TYPE: integrated data management system and word processor
COMPUTER: Apple II series, Commodore 64
DESCRIPTION: This program is powerful, easy-to-use and is value-priced. Its features include: on-line help at all times, merging of text and data between the modules, "what you see is what you get", search and replace, and more.
PUBLISHER: Software Resource Group, Inc., 1095 Airport Road, Minden, Nevada, 89423 (702)-782-9731
COST: $49.95

NAME: DENTAL OFFICE MANAGEMENT MAC XL
TYPE: dental management program
COMPUTER: Macintosh XL with 1MB of RAM and 10MB of internal hard disk storage
DESCRIPTION: This program includes a complete appointment scheduling system, a private patient accounts receivables, a claims form preparation system, a patient chart history system, an integrated word processing system, and a financial history records system.
PUBLISHER: CMA Micro Computer, 55722 Santa Fe Trail, Yucca Valley, CA, 92284, (619)-365-9718.
COST: Not available at this time.

NAME: INFORMIX-SQL
TYPE: relational database management system
COMPUTER: can be used on both UNIX and MS-DOS operating systems.
DESCRIPTION: This system enables you to create and maintain databases, design custom screens and menus, perform calculations and aggregate operations, and produce custom-formatted reports. It incorporates advanced retrieval techniques, in addition to allowing an unlimited number of columns, tables and indexes within a single database.
PUBLISHER: Relational Database Systems, Palo Alto, CA (415)-424-1300
COST: Not available at this time.

NAME: PROTECH
TYPE: microcomputer security device
COMPUTER: all types
DESCRIPTION: This security device is installed inside the equipment and hidden from view. Therefore, a thief must run away with the stolen microcomputer emitting a piercing scream. PROTECH insures that security personnel will be following the thief, not discovering an empty space where the equipment used to be.
PUBLISHER: Integrated Technology Worx, 1173 Pittsford-Victor Road, Pittsford, NY, (716)-384-5640
COST: Not available at this time

NAME: DISK TREE
TYPE: desk accessory
COMPUTER: N/A
DESCRIPTION: This newest desk accessory holds up to 20 disks vertically within easy reach. Dust is no problem because the disks tilt out slightly and are protected by their own dust jackets.
PUBLISHER: The Disk Tree Company, 404 Liberty Lane, Westerville, OH, 43081 (614)-891-5405
COST: $9.95 each

NAME: QUADCHROME II
TYPE: high resolution color monitor
COMPUTER: IBM PC and PC compatibles
DESCRIPTION: This monitor has a 14-inch tube that can display up to 16 sharp colors at once as well as 25 lines of 80 characters. Has 640 by 240 addressable dots. Controls provided include contrast, brightness and vertical hold.
PUBLISHER: Quadram Corporation, 4355 International Blvd., Norcross, GA 30093, (404)-923-6666
COST: $599

NAME: STARBRIDGE DOS
TYPE: Menu program
COMPUTER: IBM PC, COMPAQ, or any true IBM compatible
DESCRIPTION: This is a menu program providing single-key access to most PC commands. It has been designed for new PC Users and Power Users by providing a menu of DOS commands in plain English, and features like tagging of multiple files for copy in one operation. On-line help prompts can be accessed at any time. Complete sub-directory copies can also be accomplished in one operation. A Custom Menu building feature allows users to create their own menu of frequently run programs. A communications program is included for access to the company's Electronic Hotline.
PUBLISHER: Starbridge Technologies Corp., 1925 Century Park East, Los Angeles, CA 90067, 213-277-3163
COST: $49.95

NAME: MA-1: DATA POINT GEOMETRY
TYPE: General purpose applied math
COMPUTER: Apple IIe, IIc, and II+ with 16K Card.
DESCRIPTION: This program will quickly and easily solve 50 problems dealing with distances, angles, circles, and areas for property, building lay-outs, sub-divisions, floor plans, landscaping plans, etc. The program has been written in such a manner as to make it unnecessary for the user to understand the mathematical concepts involved in order to solve everyday type measurement problems, such as finding the area of an odd-shaped piece of land. Linear measurements may be in MI, YD, FT, IN, KM, MT, CM and MM; a conversion routine between the units is included. Ideal for contractors, developers and the like.
PUBLISHER: A/E Software Systems, Inc., 165 S. Union Blvd., Suite 566, Lakewood, CO 80228. (303)-987-2537.
COST: $400 without graph, $500 with graph

NAME: QUICKINDEX
TYPE: high-speed indexing program
COMPUTER: IBM and compatible personal computers
DESCRIPTION: This program will produce dBASE compatible index files up to 10 times faster than dBASE.
PUBLISHER: Fox & Geller, Inc., 604 Market Street, Elmwood Park, NJ 07407
COST: $69 for copy protected version or $99 for non-protected version.

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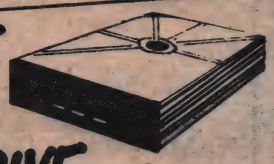

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Coming Events

If you know of or have a trade show, swap meet or club meeting connected with the computer field, we'll run an announcement in the COMING EVENTS section FREE of charge.

JUNE 1985

JUNE 2-5
Consumer Electronics Show/Summer. Chicao, IL. Call CES for more info, 312-861-1040.

JUNE 3-6
Robots 9, Cobo Hall, Detroit, MI. Call 215-384-7262 for more information.

JUNE 6-9
Computer Showcase Expo, Dallas, TX. Call The Interface Group for more info, 617-449-6600.

JUNE 6-9
Computer Showcase Expo, Seattle, WA. Call Interface Group for info, 617-449-6600.

JUNE 8
Epson Interact '85 National User Workshop, Write P.O. Box 2854, Torrance, CA 90509 for info.

JUNE 11-13
Government Computer Expo, Sheraton Washington Hotel, call 301-695-9562 for info.

JUNE 12-14
PC World Exposition, San Diego, CA. Call Mitch Hall Assoc. for info, 617-329-7466.

JUNE 13-14
Conference on Computer Software Uses In Transportation and Logistics Management. Contact Alice Kidder, Office of Sponsored Research at Babson College, Babson Park, (Wellesley), MA, 02157

JUNE 13-16
Computer showcase Expo, Philadelphia, PA. Call The Interface Group for info, 617-445-6600.

JUNE 17-19
3rd Annual PC Expo, New York, NY. Call 1-800-922-0324 for more information.

JUNE 20-23
Computer Showcase Expo, Milwaukee, WI. Call The Interface Group for info, 617-449-6600.

JUNE 25-27
Computer Graphics '85 West, Los Angeles, CA. Call 703-698-9600 for more info.

JULY 1985

JULY 10-13
1985 NOMDA Convention, Convention Center, Las Vegas, NV, call Irene Nelson at 312-860-9400

JULY 15-16
Computer Operations Management, Miami, FL. Write the Office of Professional Development, P.O. Drawer 912, Clemson, SC, 29633 for more information.

JULY 15-18
1985 National Computer Conference, Chicago, IL. Call AIFPS for info., 703-620-8900.

JULY 25-28
Computer Cornucopia Magazine, Workshop & Outdoor Recreations in Oregon. No charge for workshop, nominal charge for rafting, etc. For information call Dorcas Osensis, 503-382-8048 before July 1, 1985.

AUGUST 1985

AUGUST 10-11
Computerfest '85, Dayton, OH. For more information write Computerfest '85, 143 Schloss Ln., Dayton, OH, 45418-2931, or call Mark Hanslip at 513-268-7225.

AUGUST 13-15
Computer Graphics '85 East, Boston, MA. Call 703-698-9600 for more information.

AUGUST 21-23
MacWorld Exposition, Boston, MA. Call Mitch Hall Associates for info., 617-329-7466.

SEPTEMBER, 1985

SEPTEMBER 4-5
Using Microcomputers for Executive Leverage, Vista International Hotel, New York City, NY. Call 212-759-0900 for further information

SEPTEMBER 4-6
National Software Show, Washington Convention Center, Washington, D.C. Call Sam Slack at 609-848-1000 for info.

SEPTEMBER 5-7
Byte Computer Show, Dallas, TX, call the InterFace Group at 617-449-6600 for info.

SEPTEMBER 11-13
PC World Exposition, Toronto, Canada, contact the Mitch Hall Association at 617-329-7466.

SEPTEMBER 12-15
Tampa Bay Computer Show, Curtis Hixon Convention Center, Tampa, call CompuShow, Inc. at 301-263-8044 for info.

SEPTEMBER 16-18
Computer Language Seminar/Workshop, Sheraton-Commander Hotel, Cambridge, MA, for more info call or write to Beatrice Blatteis or Carl Landau, CL Publications, 131 Townsend St., San Francisco, CA, 94107, (415)-957-9353

SEPTEMBER 19-21
Byte Computer Show, New York, NY, contact the InterFace Group at 617-449-6600.

NOVEMBER 1985

NOVEMBER 10-13, 1985
THE NINTH ANNUAL SYMPOSIUM ON COMPUTER APPLICATIONS IN MEDICAL CARE will be held at the Baltimore Convention Center. It will offer a forum for professionals from both the health care and computers fields to come together, to listen to exchange ideas, to learn from each other and to leave with some new insight into solving problems in medical computing. For further information contact SCAMC, The George Washington University Medical Center, Office of Continuing Medical Education, 2300 K St., N.W., Washington, D.C. 20037.

NOVEMBER 13-15
THIRD INTERNATIONAL CONFERENCE ON THE FUTURE OF OPTICAL MEMORIES, VIDEODISKS, AND COMPACT DISKS TO THE YEAR 2000 will be held at the Holiday Inn Union Square, San Francisco, CA. For further information, contact Judith P. Hanson, TOC Coordinator, Technology Opportunity Conference, P.O. Box 14817, San Francisco, CA, 94114, at 415-626-1133.

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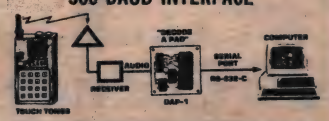

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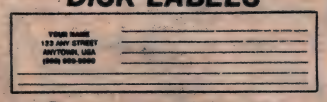

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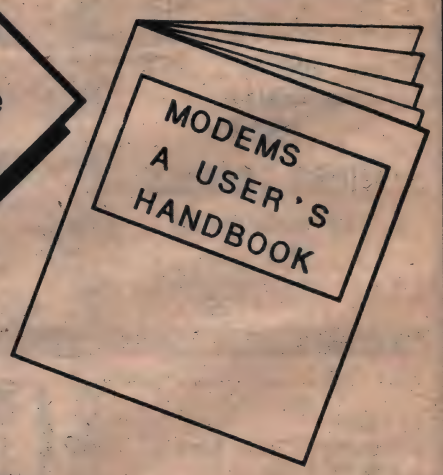

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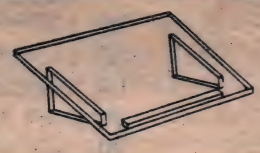

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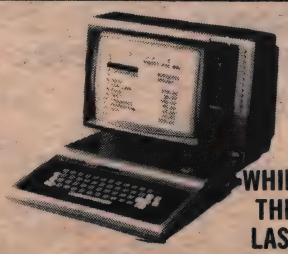

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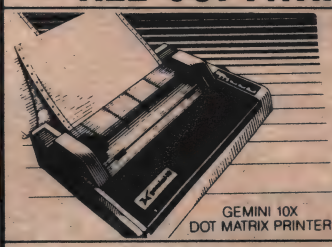

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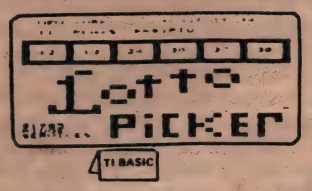

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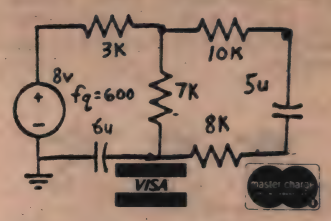

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IBM PC XT Hardware Maintenance and Service Reference Library #6936809. For repair Technicians and analysts, software test all functions, Peripherals and tells you how to fix it, with this any one can repair an **IBM PC XT** Machine. Never used, in original carton US $95 + shipping. **LUIS BAEZ,** 7922 East Dr #7, North Bay Village, Florida 33141. Ph 305-756-5687 Morning. 7-68

IBM PC compatible board. XT 8-slot motherboard ok RAM, no BIOS, $230. Printer card with cable, $40. Disk controller card with cable, $68. 512k RAM card with ok RAM, $84. All assembled & tested. Less IC and bare PCB version also available at low low price. Price include shipping & handling. Free catalog. **Tang Enterprises,** 16516 Sealark #773, Houston, Texas 77062. 6-67

IBM PCjr Parallel Printer Attachment, used less than one month before expanded system no longer required it. Bought new at $100. Sell for $75 (firm); I pay shipping if paid in advance; COD add $8. Call **Gary** at 615-929-8567; no collect calls.

IBM PUBLIC DOMAIN
220 VOLUMES-RENT AND COPY for $1 each or we will copy for you! $3 SSDD volume, $6 DSDD. Sampler disk $5. (20 files). Send LSASE for info (specify computer): **FUTURESYSTEMS,** Box 3040(C), Vista, CA 92083.

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JOGGERS - MARATHONERS! Great runners' software, "Personal Running Log and Training Analyzer" for IBM PC, PCjr by **LYNN-LEA SYSTEMS.** See ad with identical title under category number 103 (TRS-80 Software) for full details.

LOTUS 1-2-3 $155; Lifeboat C $75; TK! Solver $135; Coherent C $150; C86 C Compiler $100; DR Logo $45; Mutliplan $70; Word $115; Framework $170; Wordstar $150; C Window $125; Lattice "C" $155; CP/M for IBM PC XT $30. **216-729-3203.**

MULTIMATE 3.22. Disks and manual. Never opened, $150. Visicalc, Visifile, Visitrend/Plot, Wordstar 3.24, Spellguard, Memory Shift. With manuals, very slightly used, $30 each. Money orders only to **Walter Wohleking,** 5 Howard Drive, Huntington, NY 11743. 516-754-9041.

OPEN ACCESS, $225. Perfect Software Series, with TIM IV, $300. Suspect, Zork, $15 each. **701-968-3834** after 9pm, or Box 182, Cando, ND 58324. 7-67

OPEN SYSTEM software. General Ledger, Team Manager (report writer), interpreter, sells for $1400+ we will sell for $600. **Louis Saparito,** College Ave., Lima, NY 14485.7-67

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PAYCHECK payroll program for restaurants. Prints checks and keeps track of employees, wages, salaries, tips, and all taxes for the week and year-to-date totals too! 8087 version available. 10 page manual included $59.95. **Micronics Technology,** 449 Barbados Way, Niceville, FL 32578, 904-897-4257. 7-68

PCJR 2nd Drive adapter board $99. Full 2nd drive extrnl kit w/ps, case, 40/trk DSDD drive $339. IBMPC can talk. Full kit (requires RS232) $999. SASE, VISA/MC. **Z-Eighty,** Box 28355CS, Columbus, Ohio 43228-0355. 7-67

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PERFECT PRINTER. Use your printer and its special features like a typewriter. Both immediate and buffered modes (correct before you print). $19.95 includes shipping. **Micronics Technology,** 449 Barbados Way, Niceville, FL 32578 904-897-4257. 6-67

PSYCHOLOGICAL TESTING PACKAGE for IBM PC. Includes 8 different tests offering insights into your personality. $49.95 postpaid. **Phoenix Data Systems,** 3701 Division St., Suite 222, Metairie, LA 70002. 5-66

Printer Control Utility. ShareNET™ runs under DOS2.0, DOS2.1. $80. **Interface West,** P.O. Box 90609, Santa Barbara, CA 93190-0609. 6-70

Public Domain IBMPC $7side/vol. Librarys: PCBLUE, CP/M86. Formats: PC, IBM86, Columbia86. SASE. VISA/MC. **Cramer,** Box 28606CS, Cols., OH 43228-0606.7-67

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RENT $20/MONTH visicalc, multiplan, dbase, lotus, multimate, cobol, pascal, fortran, pl/I, c compiler, games, chess, sargon, frogger, crossfire, flight simulator. **JVC Computer,** 142-15 Cherry Ave., Flushing, NY 11355. 7-67

RUSH!! 5000 Public Domain Catalog Disks for free. 300 pages information on each disk. Specify IBM/APPLE. Send $2 for shipping and handling. **Pan-World International,** POB-414, Storrs, CT 06268. 6-67

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SANYO MBC-55X USERS SOFTWARE
Centepede-like arcade game. Sanyo and Epson FX character font designer. Epson compatible screen dumper. Math kid tutor. U.S. captials and states. Blackjack and keyboard training. SAT prep in math. Integrated graphics and text formatter. Bundled programs in SANYO BASIC. **$12.75 each.** Write for more available software and information. **Jirapol Pobukadee,** 3524 Cottman Avenue, Philadelphia, PA 19149 215-331-8138. 5-66

SEE Seneca Software Ad, under (113B) **Commodore Software.**

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SOFTWARE DEALERS, CATALOG AGENTS, USERS.
Announcing a new product for all SANYO and IBM PCs.
Turn your computer into a Powerful Work Station with WORK FORCE 1. The ELECTRIC WORK WINDOW from CYBERSOFT.
The WORK FORCE 1 Operational Disk features Q WRITER, a Complete Electronic Typewriter Emulator; PROFESSOR'S ANALYST, a cost effective path through the financial jungle (one of our personal favorites); TIME POOL, Superior Reminder Calendar, Phone Minder, and Notepad Window; LABEL BABY, format and print for any size label including rolodex; SCALC-12, Full Function Calculator Window; SALESCOM, The Mission: Commission; ASCII Tables; Screen Dump and Save; A Complete Help Section; Elapsed Time Window; MOON PIE Grapher and more.
WF 1 is Menu Driven. Self Tutoring and easy to operate. Access from DOS.
WORK FORCE 1 is fully tested, monitor protected, printer ready, and compatible with any SANYO or IBM PC system.
Work Force 1 will list for $69.95, but we'd like to send you the Work Force 1 Operational Disk along with all necessary documentation unconditionally guaranteed for the pre-production price of $25.95. In effect you'll be buying stock in our young and growing company.
Order your Work Force disk today. Send $25.95 to: **CYBERSOFT,** Drawer 5807, Wynnton Station, Columbus, GA 31906-5807. 6-66

Software Cheap, mint in box, Murder By The Dozen $10, Learning Bridge $10; Fun With Math $5, Atari 2600 cartridges $5, Others send SASE. **Vann Roberts,** 910 Sunset Circle, Dalton, GA 30720.

THE DESK ORGANIZER- only $95! Critically acclaimed desktop mangement software, only ⅓ original retail price. IBM PC/XT/AT. **HI Tech,** Box 803, Meno. Falls, WI. 53051. 414-274-9229. VISA/MC accepted. MBG. 6-67

TRADE SOFTWARE. I have Symphony, Multiplan, Ultima III, and more. Write **V.H.S.,** P.O. Box 160536, Miami, Florida 33116.

TURBO PASCAL BREATHROUGH! Turbo Pascal(tm) has taken the software industry by storm with its speed, special features, and low price. It is light-years ahead of any BASIC, EXPLORING PASCAL(tm) now opens up this wonderful world to all individuals of limited programming experience.
In six coherent, down-to-earth lessons, EXPLORING PASCAL introduces all the fundamentals of screen display, keyboard input, loops, tests, procedures, functions, arrays, files, and much more. Each concept is explained in simple terms and then demonstrated through a series of entertaining, interactive routines. There is even a quiz at the end of each lesson to help you gauge your progress. All of this comes on disk, ready to run. No prior programming experience whatsoever is needed.
So now there is an easy, enjoyable way to learn the most exciting programming language on the market today! Available on MS-DOS for IBM PC and compatibles, and on CP/M for Kaypros. Only $49.95. Dealer inquiries welcome. **Congenial Software,** 204 Maynor Street, Pembroke, NC 28372. Phone 919-521-2027.
(tm) Turbo Pascal is a registered trademark of Borland International. Exploring Pascal is a registered trademark of Congenial Software.

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The Wonderful World of Eamon for Sanyo, IBM (some CP/M & TRS-80). This public domain software lets you make and play your own adventures! Written completely in basic. Send $2 for list of software or Main Hall and beginners cave (required): $5. Dungeon Designer: $15. Eamon Utilities: $10. Complete set: $25. **Video Shop,** 139 S. Central Ave., Marshfield, WI 54449. 715-387-1813. 7-68

UNIQUE SCREEN EDITOR Design custom screens and menus for your programs using full character set of your PC. Advanced features. C Source included. $39.95. **Jim Peters,** 1401 O'Kane #18, Laredo, TX 78040 512-727-1896. 7-67

WANTED: PC Magazine back issues 1982 - Dec. 1984. **Box 1308,** 7100 Almeda, Houston, TX 77054-2132.

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WORD FINDS! Quickly and easily create or solve word find puzzles on IBM PC, PC JR or compatibles with Puzzleware. Requires 128K, monochrome or color monitor, one 320/360KB disk drive, one 80-column printer. Puzzleware includes two menu-driven programs plus instructions. Send $12.95 + $2.05 P/H to: **Puzzleware,** Dept. C/S, 4618 Bexley Way, Stone Mountain, Georgia 30083. 6-67

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LOW PRICES! Bank Street Writer $50.95. PFS: Write/File $88.95. Sideways $37.50. Framework $458.95. dBase II $326.95. dBase III $458.95. 1-2-3- $326.95. Symphony $458.95. Wordstar 2000 $326.95. R:Base 4000 $296.95. Microsoft Word $269.95. Crosstalk XVI $121.95. Word Perfect $296.95. Other products available. 30 day guarantee. Add 2% shipping (minimum $3). Money order, certified and personal (3 week clearance) checks. **Sector Software,** 609 Brookview Drive, Chapel Hill, North Carolina 27514.

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NEC 8201A Notebook size computer. Expanded to 64K. Includes battery pak & AC adaptor. Only 6

COMPUTER SURPLUS SPECIALS!

4164-200NSec RAM Chips 9 For $9.75

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- Look-a-like case

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UNIVERSAL FLIP-TOP COMPUTER CASE FOR IBM CLONES

- Fits all Clone Boards.
- Complete Mntg. Hdwr.
- Steel Construction.

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IBM PC/XT ADD-ON BOARDS

Description	Price
Floppy disk Controller w/cable	$69
Western Digital Hard Dr. Controller	$195
Color Graphics Card	$145
MA Peacock Color Bd. w/printer port	$180
Hi-Res Mono/Graphics w/printer port	$165
Amdek Dual Color/Mono. Graphics with printer port & 128K memory	$225
Serial Port Card	$45
PArallel Printer Card	$40
Multi-Func., w/para., ser., clk/cal, Game, 384K Exp. 64K memory installed	$169

135W POWER SUPPLY

REAR SWITCH
HARD DISK READY SUPPLY

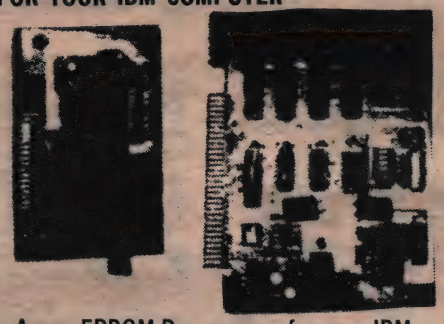
IBM COMPATIBLE $105.00

DISCOUNT PRICES ON IBM COMPATIBLE MOTHERBOARDS

YKH (DTC Look-A-Like), tested w/128K **$295**
X-Turbo - High Speed Bd., w/256K, tested **$395**

TV-GAME SWITCH $.65 EACH OR 10/$4.25

EPROM PROGRAMMER FOR YOUR IBM COMPUTER



A new EPROM Programmer for your IBM or compatible computer. EPROM types 2716 thru 27128 can be programmed. Comes with easy to follow instructions & software diskette. 2 board system makes changing EPROMS simple.

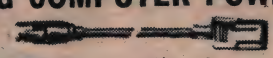
EBP-100 - Bare boards with software & instructions **$39.95**
EBP-100K - Kit of all parts **$45.00**
EBP-100T - tested unit **$109.95**

SWITCHER SPECIALS

SURPLUS COMPUTER POWER SUPPLIES

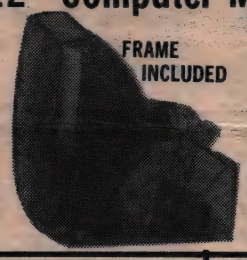
Mfg. by General Instrument - 65 Watt, +5V @ 6AMP, +12V @ 2 AMP, +24V @ .5AMP. Dim: 7" x 5" x 2" **$18.50**
Mfg. by Phihong - 90 watt model - +5V @ 8AMP, +12V @ 3.5AMP, −12V @ .5AMP. Dim: 6" x 3.75" x 1.5" **$34.50**

3 PRONG COMPUTER POWER CORDS



$.85 EA. or 10/$6.50

12" Computer Monitor



These are new monitors that have never been installed. Originally designed for Adds REGENT 200 TERMINAL. Green screen. Requires 13.2 VDC. Great for XEROX hackers. Schematics included **$27.50**

IBM KEYBOARD

$67.95

IBM COMPATIBLE KEYBOARD

We found a local distributor that went bankrupt. We were able to purchase a number of IBM compatible keyboards. We offer these keyboards to you at tremendous savings.

KYBD-88 ..... **$67.95**

KEYTRONICS 5151 COMPATIBLE

New keyboard with split cursor & number pads. We found these at the same factory that the QUME keyboards are made.

KYBD-5151 ..... **$117.95**

DISK DRIVE SPECIALS

TEC 501 half high SSSD drive. Good for Xerox, Commodore, Atari. FB-501 ..... **$39.95**
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SEAGATE ST-506 5 MEG Hard Disk Surplus Special **$135**
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K2 Board (tested), 9" Green monitor & keyboard. All for $275.00
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81 Series ROMs $7.00

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K2 with sockets $27.50
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K10 populated, tested $290.00

MISC. CABLES

14" 40 Pin - 40 Pin Header $3.25
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19" 2x5¼" to 34 Pin Header ... $4.00
15" Single 5¼" to 34 pin header $3.50

RADIO SHACK COMPUTER SURPLUS

MODEL III MOTHERBOARD BLOWOUT

TRS-80 MOD III MOTHERBOARDS

Populated boards with all parts except 3 ROMS & RAM. We have thousands of these to close out.

MOD-III ..... **2/$24.00**
ROM SET **$20.00**

HARD DISK CONTROLLER BOARD

These boards are complete with all components including ROM sets. They are available for the TRS-80 models 2, 3, 4, 12, & 16.

HDC-80 ..... **$27.50**

MODEL II POWER SUPPLY

140 watt switching power supply. Has 4 outputs; 5volts @ 8.6amps, 12volts @ 4.5amps −12volts @ .25amps, & 24volts @ 1.7amps. This supply may be used to run many other types of computers. Complete with schematics. 10"x6"x2".

SPS-80A TESTED SUPPLY **$24.50**
SPS-80B "AS-IS" **$8.50**

TELEPHONE CIRCUIT BOARDS

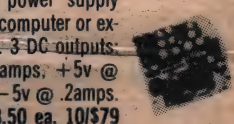
Complete circuit boards with all components. Includes piezo ringer, microphone & dialer IC.

TCB-80 ..... **$2.25ea or 10/$12.50**

TI99/4A COMPUTER SURPLUS

Switching power supply for TI 99/4A computer or expansion box. 3 DC outputs: +12v @ .4amps, +5v @ 1.1amps, & −5v @ .2amps.

PS-4A ... **$3.50 ea. 10/$79**



KEYBOARD ASSEMBLY

New TI keyboard, 48 keys, unencoded output. Terminates to 15 pin connector. Solid frame 4"x9". Grey colored keys.

KEY-48 ..... **$3.50 ea. or 10/$19**

Astec #UM1381-1 Modulator can be used with all video sources. Built in A/B switch. Operates on 12vdc. Hook-up diagram included.

MOD-1381 ..... **$3.50ea or 10/$15**

CASSETTE INTERFACE CABLE

Has DB 9 connector on one side to 3 phono jacks on the other.

CIC-93 ..... **$2.50ea or 10/$13**

POWER TRANSFORMER

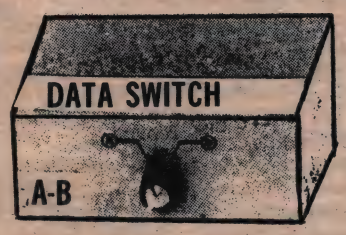
Dual output: 18vac @ 22va & 7.5vac @ 1va. Heavy duty.

TN-18 ..... **$2.50ea or 10/$22**

SURPLUS COMPUTER CONNECTORS

DB-9 Female PC mount right angle	$1.35
DB-15 Male PC mount right angle	$1.50
DB-25 Male PC mount right angle	$2.25
IDE-20 20 Pin card edge	$1.50
IDE-34 34 pin card edge	$1.90
IDE-50 50 pin card edge	$2.25
IDS-20 20 pin header	$1.25
IDS-50 50 pin header	$2.00
DB-25 male solder pot	$1.25
DB-25 female solder pot	$1.25
DB-25 hoods	$.75
Centronics Male 36 pin solder pot	$2.85
DB-25 Female ribbon crimp-on	$2.75
DB-25 Female empty crimp shell	$.40
IDH-34 PC mount straight header	$1.00
IDH-34R Right Angle mount header	$1.00
KJ-5 PC mount 5 pin keyboard jack	$.45

SWITCH BOX



DATA SWITCH

An extremely rare item to find on the surplus market. This A-B switch lets you share your computer with any 2 peripherals (serial or parallel) **$39.95**

DISC DRIVE ENCLOSURE

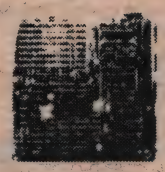
WITH POWER SUPPLY

Enclosure for 2 full hgt. 5¼" drivees. With switching power supply **$37.50**

ISOLATION TRANSFORMER

117VAC @ 125VA. MFG. BY SIGNAL TRANS.
$3.00 Each − 10/$20.00

XEROX 820 COMPUTER SURPLUS



XEROX 820-I
Z80 SINGLE BOARD COMPUTER

- 64K RAM
- 80 x 24 Video
- Floppy Disk Controller
- 2 Parallel Ports
- 1 Serial Port

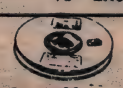
820-1 Motherboard - assembled & tested $89
820-1 Keyboard - no case $35.50
820-1 Keyboard cable $15.00
820-2 Motherboard, assembled & tested $225
820-2 Keyboard - no case $37.50
820-2 Hard disk controller, fixed daughter bd. $37.50
8/16 processor bd. assembled & tested $85

WALL PLUG ADAPTERS

12VAC @ 265MA ... $1.75
12VDC @ 300MA ... $2.50
6VDC @ 300MA $2.00

3 VOLT LITHIUM BATTERY

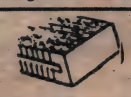
Used as battery back-up on most multi-function cords.
Mallory BR-2325
$1.00 EACH — 10/$5.00



RIBBON CABLE

10 Cond. 28 guage, colored **$5/100' Roll**
14 Cond., 28 guage, grey **$5/100' Roll**
25 Cond., twisted pair, 28 ga. **$10/100' Roll**

TI COMPUTER FLOPPY DRIVE CABLES



DUAL FLOPPY DRIVE CABLE

Cable is 30" long with 3-34 pin card edge connectors.

CFD-30 ..... **$4.00 ea. or 10/$25**

SINGLE FLOPPY DRIVE CABLE

Cable is 15" long with 34 pin card edge & 34 pin header conn.

CFS-15 ..... **$2.00 ea. or 10/$14**

weeks old $600. Also, four 8K RAM chips - $150 or $37 ea. Never used. 3490 Suncrest Lane, Florissant, MO 63033. **Jim 314-921-3204.**

NEC 8201A Portable Computer with 16K, modem and manuals, full warranty included. Only $265. **219-259-2941.** 7-67

NEC APC-4 Color 2-D CAD System with 256K RAM, 2-8" DD, Grafics Board, Digitizer, Plotter, and Autocad Software with ADe. MS-DOS, dBaseII, CP/M-86, Communications Software, and more. **John Hobbs,** 19 Sanford St., East Longmeadow, MA 01028 413-733-7122. 6-66

NEC PC8800 computer with four DSDD 8" drives(5 mb storage), high res RGB output, serial port, parallel port, green phosphor monitor, printer cable, RGB cable, Multiplan, Wordstar, Mailmerge, all manuals, original $4600., now only $2250. **219-259-2041.** 7-67

(116A) NEC COMPUTERS WANTED

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$975

Spinwriter with serial interface and tractor feed. 30 day guarantee. **202-944-3900.**

PUBLIC DOMAIN PC-8000 software. 70 CP/M and NBasic disks, $4 each. Catalog SASE. **Long Island NEC Users Group,** 75 Weaving Lane, Wantagh, NY 11793. 2-66

PUBLIC DOMAIN PC-8000 software. 95 CP/M and NBasic disks, $4 each. Send SASE for catalog. **Long Island NEC Users Group,** 75 Weaving Lane, Wantagh, NY 11793. 7-71

(117) OHIO SCIENTIFIC

OSI 230C (48K). Two 8" floppies. Esprit Terminal. Software: Word Processing, General Ledger, Data Base Management. $2,000. **Dakota Bible College,** Box 1381, Huron, SD. 605-352-9227.

(117A) OHIO SCIENTIFIC COMPUTERS WANTED

(117B) OHIO SCIENTIFIC SOFTWARE, PERIPHERAL

(118) OSBORNE COMPUTERS FOR SALE

BOARDS, CRT's, drives, double density kits: very competitive prices. See our ad in this magazine for details, or call us at 415-493-5930. **Computer Parts Mart.**

I have Osborne computers for sale with warranty. New, Used, both 01's & Execs. We also do upgrades. **Godfather's Used Computer Syndicate,** P.O. Box 3037, 1154 W. SR 436, Forest City, FL 32714 305-774-1111.

OSBORNE OSBORNE OSBORNE Complete Osborne Dealer Support is here! Computers and peripherals at reasonable prices! **B Systems,** 721 S. Littler Place, Edmond, OK 73034 405-341-7437. 7-68

OSBORNE Screen Pac (80-columns) $180. Double Den. $145. Comm Pac (modem) $85. CALL for more information. **B Systems,** 721 S. Littler Place, Edmond, OK 73034 405-341-7437. 7-68

Osborne Model 1 **Parallel Printer cables, $14.95.** Phone 817-265-9962. **S.P.I. Systems,** 1731 W. Division, Arlington, Texas 76012.

(118A) OSBORNE COMPUTERS WANTED

I Buy, Sell, & Trade Osborne computers working or not. We also do upgrades. **Godfather's Used Computer Syndicate,** P.O. Box 3037, 1154 W. SR 436, Forest City, FL 32714 305-774-1111.

(118B) OSBORNE SOFTWARE, PERIPHERAL

FASTFILE Professional Data Management System. Best filing program for ZX81/TS1000/1500 or money back. Written in lightning fast 100% machine code. Sorts 1500 5-byte records in 24 seconds. 500 in 3 seconds! Searches through 1500 records in 1 second! Adds up 1500 decimal numbers in under 2 seconds. Built-in word processor allows easy data entry. 4 data types stores more information in less memory. Add, change, delete, LPrint, search and query are all as easy as pointing your finger. Several different kinds of files can be in memory at the same time. Complete query system answers "How many...?," "How much?," or "Which...?" type questions. Includes an example checkbook program which can store 400 checks in 16K! Manual includes information on how to create coupon/refund files, mailing labels, inventory control, address book, appointment schedular/calendar and your own files. To order send $19.95 plus $2 P&H for cassette and manual: **Tom E. Cole,** 1314 Speight #15, Waco, TX 76706. Texans add local tax.

FREE OSBORNE software available through the Public Domain Users Group. Over 200 programs: games, (adventure, chess), utilities & specialty (Modm7, Database). For information send SASE to: **Public Domain Users Group,** P.O. Box 1442-C8, Orange Park, FL 32067. 7-67

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PERSONAL PEARL like New $100 each or best offers. Call after 7pm CST. Evan: **612-937-2765.** 6-66

(120) MS/DOS COMPUTERS FOR SALE

(120A) MS/DOS COMPUTERS WANTED

(120B) MS/DOS PERIPHERALS

(121) KAYPRO COMPUTERS FOR SALE

(121A) KAYPRO COMPUTERS WANTED

(121B) KAYPRO SOFTWARE, PERIPHERALS

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(126) MISCELLANEOUS MICROCOMPUTERS

AIM-65 with enclosure, power supply, eprom programmer, A/D, all documentation. Includes built in ASCII LED display, printer, BASIC, full keyboard. Easy interfacing for dedicated uses. Good for learning BASIC or assembly. $150 complete - firm (PPD). **Jim 201-342-8894.**

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Altos 8600-12 w/20 meg hard disk, 512K, 8" DSDD floppy. Five user system. MPM/86, Xenix Operating Systems Available. Demos in original cartons. Many available - quantity discounts. **BLE** 202-944-3900.

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MPX-16, MS-DOS compatible, 8088, 64k ram, 2 serial, 2 parallel ports, floppy controller, Keyboard interface, power supply. $750. **215-441-4593** add-post ccr. 6-67

SAGE II COMPUTER SYSTEM 512K RAM, dual floppy disk, P-system, Freedom 100 terminal, Okidata 84P printer, manuals, cables, 2 yrs old. Asking $3500. **716-689-8637.** 6-67

VECTOR GRAPHICS 4 Microcomputer, 2 double sided drives (600 KB) CPM. Never used, good working order. CHEAP. Call **Mr. Galter,** 212-714-2050.

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(127A) XEROX COMPUTERS WANTED

COMPUTER SOLUTIONS

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Monographics Plus (Lotus) IBM PC/XT	545	395
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Monographics w/pp IBM PC/AT	499	299
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Modular Monographics	395	269
Module w/pp	95	85
Module w/64K, dk	275	219
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Monoadapter w/pp IBM PC/AT	250	180
Colorgraphic card IBM PC/AT	244	175
Bob Board IBM PC/AT	595	449
Bob Board w/Exp. IBM PC/AT	820	649
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Graphics Plus II (Lotus)	495	CALL
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QUADRAM		
Quadvue mono IBM	345	CALL
Quadcolor PC/AT	295	199
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Multi Exp w/384K PC	595	375
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Jr. Cadat		CALL
Jr. Captain 128K	349	CALL
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Ultrapack mono PC/AT	680	CALL
CARDCO		
Cardprint/B Comm.	60	49
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ORANGE MICRO		
Grappler ' Apple II	175	109
Buffered Grap ' Apple II	239	155
Grappler CD Comm.	139	95
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Video Board	219	179

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Bernoulli Box Plus 10 meg IBM PC/XT	2895	2199
Bernoulli Box Plus 20 meg IBM PC/XT	3895	CALL
Bernoulli Box Single 10 meg T.I.	2795	CALL
Bernoulli Box Dual 20 meg T.I.	3795	CALL
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TALLGRASS		CALL

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121 12" Green IBM	189	139
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300A 12" Amber	199	139
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Color 300 12" Color	349	CALL
Color 500 13" RGB IBM	525	CALL
Color 600 13" RGB/Comp	599	CALL
Color 700 13" Super RGB	749	CALL
Color 710 13" Ultra RGB	799	CALL
COMREX		
CR-5650 12" Green	129	105
CR-5650 12" Amber	129	105
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ZVM135 12" RGB/Comp	599	479
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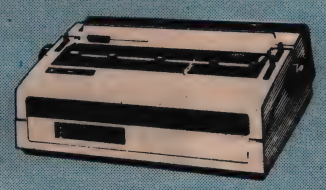

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ML92MAC 160/40 CPS Apple Image	569	375
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HR-25	845	615
HR-35	1245	865
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103 Smart Cat RS-232	249	169
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212 Apple Cat 1200 Apple II	599	409
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	List Price	Our Price
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COMPAQ		
PC 256K 2 DR	2995	1995
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(127B) XEROX SOFTWARE, PERIPHERAL

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(129) S-100 COMPUTERS

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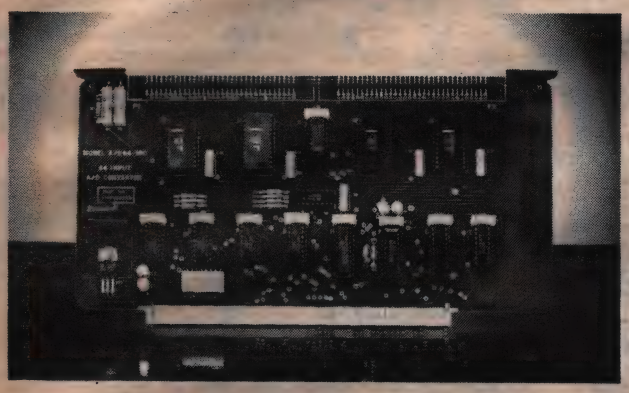
64 INPUT A/D CONVERTER



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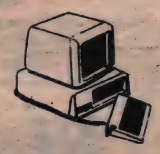

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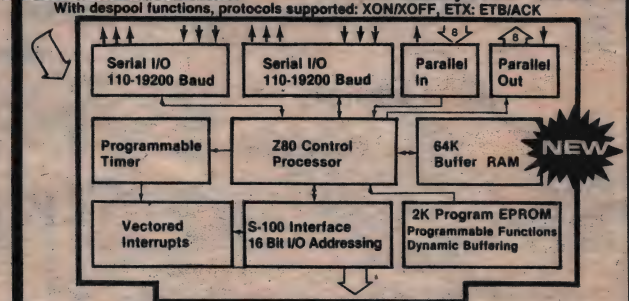

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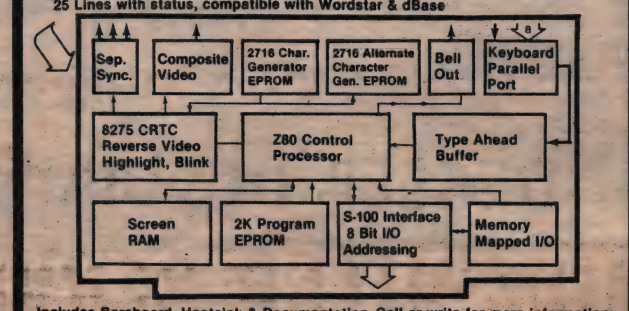

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LOMAS LDP LIGHTNING I, 10 mhz 8086, 1/2 meg. ram, 5 board set, ECT frame, 5 meg Winchester, MD 1002 controller, up to 3-40 meg drives, 2 DSDD height 5" drives. MSDOS incl., runs CCP/M. $1700 for above. Boots off 5" or 8". DS dual 8" Qume system $700. Mitsubishi dual height, $800. Will conf. Extra software. **Scion Micro Angelo w/monitor $500. 215-646-4894.**

MORROW DECISION I in 8 slot mainframe, all Morrow components. 64K static ram, DJDMA Disc Jockey controls, dual 5¼" drives. Reads **Northstar,** Morrow, Televideo, Osborne, etc. Full documentation, CPM 2.2, much software (Move-it, L80, M80). Upgradeable to Morrow multi-user system. Asking **$1,200.** 8" DSDD drive in cabinet with power supply available. Also Esprit terminal. Call **Bob 201/722-2040** days, 215/862-5037 evenings and weekends. 7-68

NORTH STAR Horizon II with Double Density. NS DOS and CP/M. Extra software. $895. Bob **219-398-9348.**

S-100 BOARDS

CompuPro Disk 1	$225
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1 Micro System 8K RAM	$35
Northstar D/D Controller Board with DOS & Basic	$175
VDM-1 Video Board	$50
Hayes 300 Modem Board	$100
U.S. Robotics 300/1200	$225

All Boards with manuals
805-687-7121 or 805-967-3001

S-100 SYSTEM. Compupro CPU-Z, CCS-64K, Micropolis Dual-Disk, Microsprite Graphics, Tdl SMB-I/O, Adds Viewpoint, much more send sase for details. **Richard Ray,** 347 S. Havenside Avenue, Newbury Park, CA 91320.

SM CPU CB2 runs at 2/4 Mhz. too many options to mention. Includes ROM...$75. VB-1C Video board by SSM, 16x64 display, never used. $35. **Dale Mosher,** 718-937-6283.

TELETEK HD/CTC Hard disk controller, handles 2 drives and tape backup. CP/M and TurboDOS software available. $200 OBO. Call **215-861-0850.** 20 Meg. cart. tape $1000 obo. **Genesis Computer,** PO Box 152, Hellertown, PA 18055.7-67

TELETEK SYSTEM, with Z-80 Systemaster board, in 8 slot Integrand Cabinet. Includes dual 8" DSDD drives (1.2 meg each), 2 serial ports, CPM 2.2, full documentation. 90 day money back **Guarantee.** Asking **$900.** Esprit terminal available. Call **Bob 201/722-2040** days, or 215/862-5037 evenings and weekends. 7-68

THE PHILADELPHIA Area Historic Altair Society is looking for some of the original Altair 8800 computers bearing low serial numbers. We may offer to pay up to $10,000 for "museum quality" machines in Mint condition (fully or partially assembled). Send photo and description of your unit for consideration to: **PAS,** Box 665, Springhouse, PA 19477. The ALTAIR...A proud computer on a dusty shelf! 7-67

VECTOR GRAPHICS MZ with Hazeltine 1500 CRT & Dual DS/DD Micropolis Drives, 64K, CP/M 2.2 plus software $750. Corvus 20MB hard disk with S-100 I/F card, $1500. **Matrix Systems,** 916 Via Nogales, Palos Verdes, CA 90274. 213-375-7784.

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16K Static RAM 4mhz Phantom Bonhable $45 each. **803-242-9096** Eves. EST.

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COMPUPRO CPU 8085/8088 $175, CPU-Z 6MHz $140, MPX-1-4K $150, SS1 $200/$150, Bus Terminator $10, Cromemco Bytesaver 32K-2716 $50, SD SBC-100 With Monitor ROM $50, Jade Double-D Disk Controller AS-IS $75, Jade Expandoram with 48K $50, Morrow Keyed-Up 8080 $50, Morrow/Shugart 801 Drive in Cabinet $175, IMSAI S10-Z With Cables $50, Optronics Tech. DCU $30. Want Votrax Synthesizer. Tuesday/Thursday eves. Weds. **408-423-0122.**

(6) COMPUPRO Interfacer 1 BDS. Asking $50 ea. (4) 20 meg Fujitsu 8" hard drives complete under warranty, asking $1400 ea. Call **309-764-4344** ext. 219. Ask for Greg. 5-66

CP/M User Group Software now available on rental! Send for our Directory disk, just $5 pp. or a SASE to **National Public Domain,** 1533 Avohill, Vista, CA 92083. 6-70

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EPROM PROGRAMMER by Ackerman Digital, will burn all 1-2-4-8K EPROMS, with software and docs. $250 OBO. **215-782-1452,** evenings.

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Northstar MDA-AD DD/QD 5¼ disk controller board, fact. ass., with documentation, ver. 5.2 DOS & BASIC. $250. PP/CCR. **Steve Sampson,** P.O. Box 180, Running Springs, CA 92382 714-867-7664. 7-67

(131) S-50 COMPATIBLE, PERIPHERAL

5 Megabyte Hard Disk Add-on for SS-30 or SS-50 from $500, with software and interface. **DIGITAL SEARCH,** 803-877-9444.

(132) HEATH COMPUTERS FOR SALE

8" Shugart ½ height DSDD MOD SA 810-1 mint condition with 1 full year warranty. These drives do not require AC, track to track access time 3ms. Capacity is 1.6mb, $269. **CEC,** 800-228-3411, P.O. Box 1965, Burlingame, Calif. 94010. 7-69

H-89 Green Screen 64K DSDD Tandon 101-4 Drives, Spellbinder, Keyset, Much Software Used in Data Processing Office. Two Complete Systems $1500 each. **Victor Wild,** 5797 Honors Drive, San Diego, CA 92122 619-458-1728. 7-67

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MPI MOD 51S SSDD unused drives in factory boxes $88. **CEC,** 800-228-3411, P.O. Box 1965, Burlingame, Calif. 94010. 7-67

The Marion School District is announcing the sale, by bid, of Hewlett Packard TSC 300 Computer, mo lel #29402B with Hewlett Packard 7906 Disk Drive, two Digital Decwriter II, and 14 digital VT100 monitors with keyboards. Minimum of $8000. Bids will be opened on June 30, 1985. Send all bids to: **Marion School District,** 76 Elm, Marion, AR 72364, Atten: John Heath, or call John Heath 501-739-3635 or 501-739-4003, for more information.

(132A) HEATH SOFTWARE, PERIPHERAL

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(134A) HEWLETT PACKARD COMPUTERS WANTED

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Peachtree HPSystem 80. Software Accts. payable, inventory control. Accts. payable never opened. $795. Retail. Best offer. Call **Sandy,** 208-344-1172. 7-67

(136) DATA GENERAL SYSTEMS

HP 41C with mathematics, finance modules. All excellent, $155 PP. **16C** (decimal, octal, hex) excellent, $65 PP. Trades: software for compag. **Roberts,** Box 1565, So. Hackensack, NJ 07606. 6-66

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(138) DATA GENERAL, SOFTWARE PERIPH.

(148) DEC SYSTEMS FOR SALE

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(166) MISC. (HARDWARE & SOFTWARE)

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$$$$$$$ AND—OR BYLINES for Repair Information/Articles about Disk Drives, Printers, Plotters - all manufacturers, types. Also, Service Manuals wanted. **CONSUMER-TRONICS,** 2011 Crescent, Alamogordo, NM 88310. 2-66

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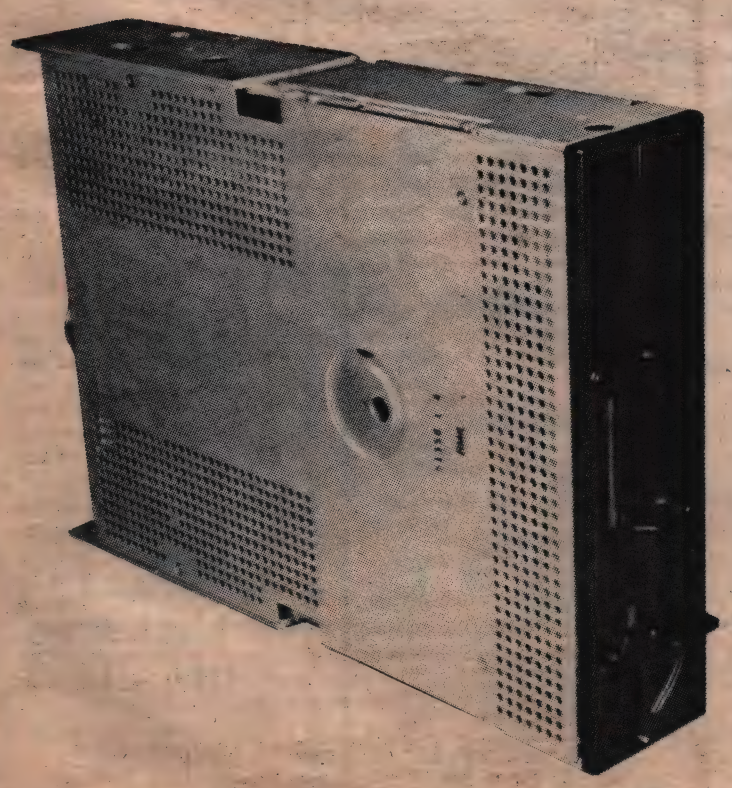

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(174) PRINTERS

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(186) MODEMS

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HAYES SMARTMODEM 300 baud, auto dial/answer, with manual, phone line cord and RS232C cable, like new, $140, shipping included, call **203-487-1442.**

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(188) MISC. EQUIPMENT

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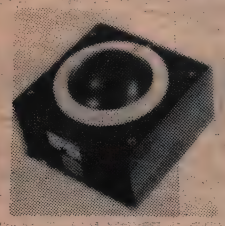

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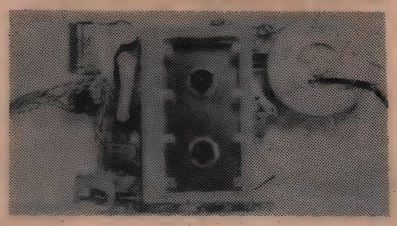

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(191) CP/M SOFTWARE

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(192) MISC. SOFTWARE

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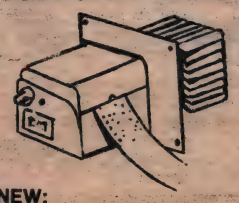

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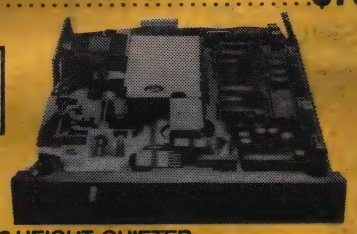

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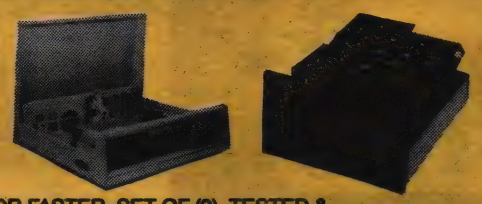

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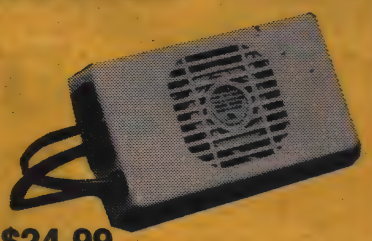

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CC174-3RA	5.50	5.00
CC174-4RA	5.80	5.28
CC174-5RA	6.10	5.55
CC174-7.5RA	6.85	6.23
CC174-10RA	7.60	6.92

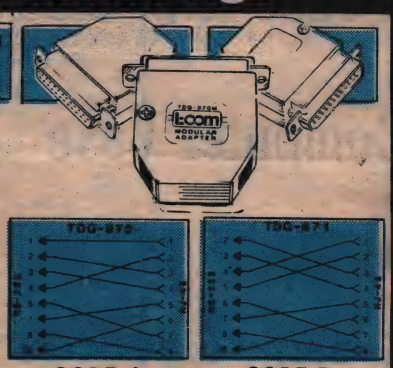
MODEL-Ft	1-9	10-24
CC58CX-1RA	5.10	4.64
CC58CX-1.5RA	5.25	4.78
CC58CX-2RA	5.40	4.91
CC58CX-2.5RA	5.55	5.05
CC58CX-3RA	5.70	5.19
CC58CX-4RA	6.00	5.46
CC58CX-5RA	6.30	5.73
CC58CX-7.5RA	7.05	6.42
CC58CX-10RA	7.80	7.10
CC59BX-1RA	5.10	4.64
CC59BX-1.5RA	5.25	4.78
CC59BX-2RA	5.40	4.91
CC59BX-2.5RA	5.55	5.05
CC59BX-3RA	5.70	5.19
CC59BX-4RA	6.00	5.46
CC59BX-5RA	6.30	5.73
CC59BX-7.5RA	7.05	6.42
CC59BX-10RA	7.80	7.10
CC62AX-1RA	5.10	4.64
CC62AX-1.5RA	5.25	4.78
CC62AX-2RA	5.40	4.91
CC62AX-2.5RA	5.55	5.05
CC62AX-3RA	5.70	5.19
CC62AX-4RA	6.00	5.46
CC62AX-5RA	6.30	5.73
CC62AX-7.5RA	7.05	6.42
CC62AX-10RA	7.80	7.10
CC174X-1RA	5.10	4.64
CC174X-1.5RA	5.25	4.78
CC174X-2RA	5.40	4.91
CC174X-2.5RA	5.55	5.05
CC174X-3RA	5.70	5.19
CC174X-4RA	6.00	5.46
CC174X-5RA	6.30	5.73
CC174X-7.5RA	7.05	6.42
CC174X-10RA	7.80	7.10

MODEL-Ft	1-9	10-24
CC58C-1RA2	6.25	5.69
CC58C-1.5RA2	6.40	5.82
CC58C-2RA2	6.55	5.96
CC58C-2.5RA2	6.70	6.10
CC58C-3RA2	6.85	6.23
CC58C-4RA2	7.15	6.51
CC58C-5RA2	7.45	6.78
CC58C-7.5RA2	8.20	7.46
CC58C-10RA2	8.95	8.14
CC59B-1RA2	6.25	5.69
CC59B-1.5RA2	6.40	5.82
CC59B-2RA2	6.55	5.96
CC59B-2.5RA2	6.70	6.10
CC59B-3RA2	6.85	6.23
CC59B-4RA2	7.15	6.51
CC59B-5RA2	7.45	6.78
CC59B-7.5RA2	8.20	7.46
CC59B-10RA2	8.95	8.14
CC62A-1RA2	6.25	5.69
CC62A-1.5RA2	6.40	5.82
CC62A-2RA2	6.55	5.96
CC62A-2.5RA2	6.70	6.10
CC62A-3RA2	6.85	6.23
CC62A-4RA2	7.15	6.51
CC62A-5RA2	7.45	6.78
CC62A-7.5RA2	8.20	7.46
CC62A-10RA2	8.95	8.14
CC174-1RA2	6.25	5.69
CC174-1.5RA2	6.40	5.82
CC174-2RA2	6.55	5.96
CC174-2.5RA2	6.70	6.10
CC174-3RA2	6.85	6.23
CC174-4RA2	7.15	6.51
CC174-5RA2	7.45	6.78
CC174-7.5RA2	8.20	7.46
CC174-10RA2	8.95	8.14

You May Never Have To Use RS232 Cables Again

A new interconnect concept allows conversion of standard serial devices using RS232 connectors to accept inexpensive Modular Telco cables for quick disconnect operation. Provides a number of advantages over traditional cabling methods.

1. Allows quick and simple change of cable length and connector sex. Simply unsnap and install a new cable, just as you would a telephone.
2. The most inexpensive alternative to traditional RS232 connectors & cables.
3. RS232/Modular Adapters are available in male or female version to satisfy all possible needs.
4. Redundant wired RJ-45 jacks allow best choice of strain relief. Also the open jack is useful for line testing, or to Daisy Chain serial devices.
5. RJ-45 Jacks are not keyed and will accept 4, 6, or 8 position Modular Cable Plugs.
6. Two basic wiring modes are available from stock. Custom versions can be quoted on request.
7. Redundant ports allow for either side entry and Daisy Chain use.



CODE A CODE B

MODEL	Type	Code	1-9	10-24	25-99
TDG870M	Male	A	16.95	14.92	13.22
TDG871M	Male	B	16.95	14.92	13.22

MODEL	Type	Code	1-9	10-24	25-99
TDG870F	Female	A	16.95	14.92	13.22
TDG871F	Female	B	16.95	14.92	13.22

Hard to Find Modular Cables for Data & Telco Use

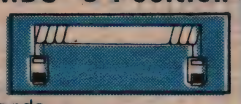
DATA MODULAR CORDS - 8 Position

- Gold Plated Contacts
- Mates with RJ45 Mod.
- Silver Gray Flat Cable
- Conforms to AT & T Standards

MODEL-Ft.	#Pos	1-9	10-24	25-99
TDC003-2	8	2.95	2.60	2.30
TDC003-7	8	3.55	3.12	2.77
TDC003-14	8	4.85	4.27	3.78
TDC003-25	8	6.95	6.12	5.42

COILED MODULAR CORDS - 8 Position

- Gold Plated Contacts
- Mates with RJ45 Mod.
- Silver Gray Round Cable
- Conforms to AT & T Standards



MODEL-Ft.	#Pos	1-9	10-24	25-99
TDC001-6	8	3.95	3.48	3.08
TDC001-8	8	4.55	4.00	3.55
TDC001-10	8	4.95	4.36	4.86

NOTE: Lengths shown in extended position

TERMINATION CORDS - 8 Position

- Tinned Solder Ends
- Silver Gray Flat Cable
- 8 Pin Plug Mates RJ-45
- Color Coded Wires for Easy Identification

MODEL-Ft.	#Pos	1-9	10-24	25-99
TDC005-2	8	2.25	1.98	1.76
TDC005-7	8	2.95	2.60	2.30
TDC005-14	8	3.95	3.48	3.08

TERMINATION CORDS - 8 Position

- Lugs on Each Wire
- 8 Pin Plug Mates RJ45
- Flat Cable - Stranded Ends
- Color Coded for Easy Identification

MODEL-Ft.	#Pos	1-9	10-24	25-99
TDC004-2	8	2.25	1.98	1.76
TDC004-7	8	2.95	2.60	2.30
TDC004-14	8	3.95	3.48	3.08

DATA SWITCH BOXES

- Sturdy Steel Cases
- RFI Safety Proof
- Light Tan Color
- High Grade Rotary Switch
- Size: 2.25" x 7.25" x 5"
- 6 LED Hi-Lo Monitor (Optional)

RS-232 12 Lines Switched		1-4	5-9
DT2512-2	2 Way (1in-2out)	99.00	94.05
DT2512-3	3 Way (1in-3out)	115.00	109.25
Switches: 2-6, 8, 15, 17, 20, 22, 24, & 25			
RS-232 All 25 Lines Switched			
DT2525-2	2 Way (1in-2out)	115.00	109.25
DT2525-3	3 Way (1in-3out)	130.00	123.50
Optional 6 LED (Hi-Lo) Monitor Add $30.00			
Centronics 25 Lines Switched			
DT3625-2	2 Way (1in-2out)	155.00	147.25
DT3625-3	3 Way (1in-3out)	175.00	166.25
Switches: 1-16, 18, 31-36, 19,30			

DATA TRANSFER SWITCH BOXES

- Sturdy Steel Cases
- RFI Safety Proof
- Dark Tan Color
- Molded Rotary Switch
- Size: 3.2" x 6" x 5.9"
- Unconditionally Guaranteed

RS-232 12 Lines Switched		1-4	5-9
DB2512-2V	2 Way (1in-2out)	99.00	94.05
DB2512-3V	3 Way (1in-3out)	115.00	109.25
DB2512-4V	4 Way (1in-4out)	135.00	128.25
DB2512-X	Crossover	120.00	114.00
Switches: 2-6, 8, 15, 17, 20, 22, 24, & 25			
RS-232 All 25 Lines Switched			
DB2525-2V	2 Way (1in-2out)	120.00	114.00
DB2525-3V	3 Way (1in-3out)	140.00	133.00
DB2525-4V	4 Way (1in-4out)	165.00	156.75
DB2525-X	Crossover	150.00	142.50
Centronics 25 Lines Switched			
CN3625-2V	2 Way (1in-2out)	155.00	147.25
CN3625-3V	3 Way (1in-3out)	175.00	166.25
CN3625-4V	4 Way (1in-4out)	195.00	185.25
CN3625-X	Crossover	180.00	171.00
Switches: 1-16, 18, 31-36, 19,30			
Centronics 36 Lines Switched			
CN3625-2V	2 Way (1in-2out)	170.00	161.50
CN3625-3V	3 Way (1in-3out)	195.00	185.25
CN3625-4V	4 Way (1in-4out)	225.00	213.75
CN3625-X	Crossover	205.00	194.75

RS232 MATE SW. BOX

This unique switching box facilitates interfacing with either DCE or DTE devices. Our RS-10 will help you do it easily. Simply move Dip switches on a matrix allocation to open, close or even crossover lines. Complete with 12ft. cable and two RS232 (DB-25) Male Terminations.

RS10.....89.00 (5-9)..... 84.55

RS232 LINE DEVICES

RS-232 DATA LINE MONITOR

A miniature Data Line Monitor determines the status of the seven key signals of the RS-232 data path. All 25 pins wired through, and dedicated red LED's report the status of: Transmit Data, Receive Data, Request to Send, Clear to Send, Data Set Ready, Data Carrier Detect, Data Terminal Ready, LED's glow at 3 Volts.

MODEL	GENDER	1-9	10-24
DLMS	M-F Shielded	37.35	33.99
NEW	Deluxe Monitor now available with red/green LED's to indicate a hi, low or open condition. Metal shield.		
DLMS-2	M-F Shielded	46.95	42.72

DATA LINE GENDER CHANGERS

Needed when connectors won't mate. Choice of shielded, unshielded, or Centronics.

RS-232 Gender Changers			
DG-25F	(F-F) Unshielded	16.95	15.42
DG-25M	(M-M) Unshielded	16.95	15.42
DGS-25F	(F-F) Shielded	18.65	16.97
DGS-25M	(M-M) Shielded	18.65	16.97
Centronics Gender Changers			
DGS-36F	(F-F) Unshielded	36.95	33.62
DGS-36M	(M-M) Shielded	36.95	33.62

RS-232 DATA JUMPER BOX ADAPTER

Used to customize RS-232 interfaces. All 25 pins terminate to 25 solder pads. The PC board is already wired to the D-Subs. Includes 25 stripped leads for custom wiring. Many interfaces could be built. Null Modems, Pin Reversers, etc. Metal snap-on covers, hardware supplied.

DJBS	(M-F) Shielded	21.95	19.97
DJBS-M	(M-M) Shielded	21.95	19.97
DJBS-F	(F-F) Shielded	21.95	19.97

RS-232 DO IT YOURSELF KIT

Allows the creation of many RS-232 variations. The following components are included in the assortment: two 25-pin D-Sub Connectors, two metal Snap-on half covers, 1 set Hardware.

DIYS	(M-F) Shielded	12.95	11.78
DIYS-M	(M-M) Shielded	12.95	11.78
DIYS-F	(F-F) Shielded	12.95	11.78

RS-232/CENTRONICS ADAPTER BOX

Used to customize printer adapters. The DB-25 has 25 flying leads, ready to be soldered to any of the 36 pin female Centronics.

DJBA	(M-F) Shielded	24.95	22.70

RS-232 SURGE PROTECTOR

Guard against voltage spikes entering your RS-232 ports. Metal varistors on lines 2, 3 & 7 clamp surges above 25 volts without affecting normal operation. This compact protector mounts in series. All 25 lines are wired through.

DSP	(Male-Female)	24.95	22.70

TOLL FREE ORDERING
800-343-1455

L-com DATA PRODUCTS
No. Andover MA 01845

MA & Technical Calls
617-682-6936

MOST NEEDED CABLE ASSEMBLIES

Dip-16 Round Jumper and Extension Cables

For use as terminating cables or extensions mating with conventional 16 pin dip sockets or plugs. All are fully populated with 16 conductors throughout. All terminations are fully molded for many years of useful service. Phosphor bronze male pins are .016" X .032". ML16PSC Coiled cord is 22" in normal unstretched position.

MODEL	Length-ft.	GENDER	1-9	10-24	25-99
ML16PP-1	1.0	Male-Male	6.85	6.23	5.89
ML16PP-2	2.0	Male-Male	7.15	6.51	6.15
ML16PP-3	3.0	Male-Male	7.45	6.78	6.41
ML16P-1	1.0	Male	3.95	3.59	3.40
ML16P-2	2.0	Male	4.25	3.87	3.66
ML16P-3	3.0	Male	4.55	4.14	3.91
ML16S-1	1.0	Female	3.95	3.59	3.40
ML16S-2	2.0	Female	4.25	3.87	3.66
ML16S-3	3.0	Female	4.55	4.14	3.91
ML-16PS-1.5	1.5	Male-Female	6.95	6.32	5.98
ML16PSS-1.5	1.5	Male-(2)Female	11.45	10.42	9.85
ML16PSC-4	4.0*	Male-Female	8.95	8.14	7.70

*Coiled Cord - 22 in. unstretched

Dip-16 Flat Jumper Cables with Molded Connectors

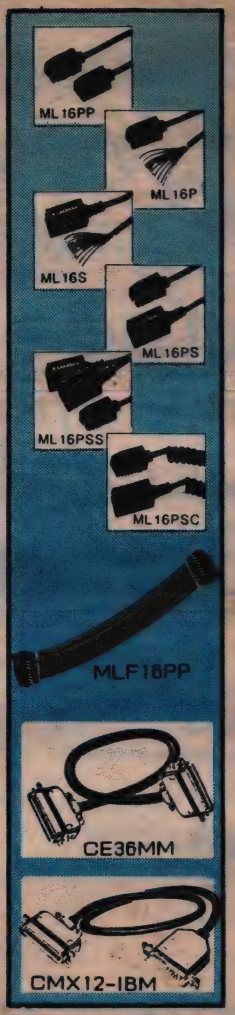
MLF16PP-05	0.5	Male-Male	3.30	3.00	2.84
MLF16PP-1	1.0	Male-Male	3.60	3.28	3.10
MLF16PP-2	2.0	Male-Male	4.20	3.82	3.61
MLF16PP-3	3.0	Male-Male	4.80	4.37	4.13
MLF16PP-4	4.0	Male-Male	5.40	4.91	4.64

Parallel Extension Cables with Centronics Type Connectors

CE36MM-5	5.0	Male-Male	30.50	29.28	27.76
CE36MM-7.5	7.5	Male-Male	34.25	32.88	31.17
CE36MM-10	10.0	Male-Male	37.50	36.00	34.13
CE36MM-15	15.0	Male-Male	44.00	42.24	40.04
CE36MM-25	25.0	Male-Male	57.50	55.20	52.33
CE36MF-5	5.0	Male-Female	30.50	29.28	27.76
CE36MF-7.5	7.5	Male-Female	34.25	32.88	31.17
CE36MF-10	10.0	Male-Female	37.50	36.00	34.13
CE36MF-15	15.0	Male-Female	44.00	42.24	40.04
CE36MF-25	25.0	Male-Female	57.50	55.20	52.33

Parallel Centronics Type Cables for IBM-PC Printer

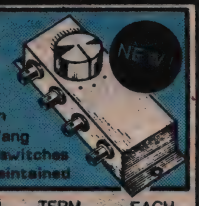
CMX6-IBM	6.0	Male-Male	39.95	38.35	36.35
CMX12-IBM	12.0	Male-Male	44.95	43.15	40.90



Note: We Stock a Most Complete Line of Standard Cables

DATA COAXIAL SWITCH

- Rugged Build
- Fully Shielded
- AB or ABC Types
- Low Contact Res
- Mounting Flanges
- Metal Construction
- BNC or TNC & Wang
- Center conductor switches
- Shield isolation maintained

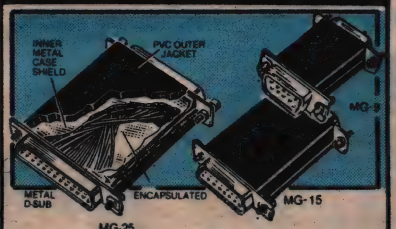


MODEL	FUNCTION	TERM.	EACH
DS12B	SPDT AB	BNC	39.95
DS22B	DPDT AB	BNC	54.95
*DS22BT	DPDT AB	BNC-TNC	56.45
DS13B	SPDT ABC	BNC	49.95
DS23B	DPDT ABC	BNC	67.95
*DS23BT	DPDT ABC	BNC-TNC	69.95

*For Wang Devices-Switches Transmit & Receive Cables Simultaneously

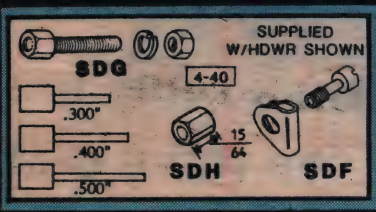
Qty Discounts & Custom Types Available

DELUXE GENDER CHANGERS



MODEL	Gender	1-9	10-24
MG9F	Female-Female	15.95	14.51
MG9M	Male-Male	15.95	14.51
MG15F	Female-Female	18.95	17.24
MG15M	Male-Male	18.95	17.24
MG25F	Female-Female	23.95	21.79
MG25M	Male-Male	23.95	21.79

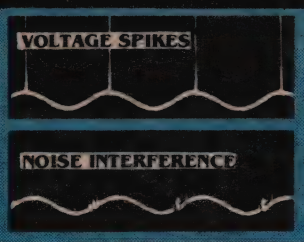
POPULAR RS232 LOCKDOWN SCREWS



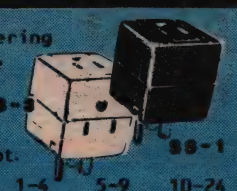
MODEL	50-450	500-1200	1200-over
SDG300	.18	.17	.16
SDG400	.19	.18	.17
SDG500	.20	.19	.18
SDH	.11	.10	.09
SDF1(Chromate)	.19	.18	.17
SDF2(Tin Plate)	.19	.18	.17

NOTICE: Multiples of 50 Only

AC LINE TRANSIENT SURGE PROTECTOR



- Prevents False Triggering
- Absorbs Spike & Noise
- Safe Voltage Level
- 2-Step Protection
- Rated: 15A @ 125VAC
- Polarized Gnd'd Recept.



MODEL	# TAPS	1-4	5-9	10-24
SS-1	Single	10.95	9.75	8.65
SS-3	3-Way	12.65	11.26	9.99

STOCKING DISTRIBUTORS WANTED

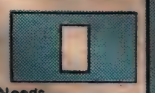
STAINLESS WALL PLATES & ACCESSORIES

STAINLESS STEEL WALL PLATES

With beautiful brushed finish to enhance any office decor. Fits any standard electrical wall box. Offered in variety to meet most exacting need, or customize your own using the blank plates. Custom hole punching available for quantity users. NOTICE: Wall plates are sold without connectors. To assure perfect fit, you are urged to use L-COM connectors, which must be ordered seperately.

BLANK WALL PLATES

- Mounting Screws Supplied
- Heavy Guage Stainless Steel
- For the Do-It-Yourselfer
- Protective Provided
- Drill Holes to your Specific Needs



MODEL	Cutouts	1-9	10-24	25-99
WP	None	3.59	3.41	3.16

BNC BULKHEAD RECEPTACLE

- Teflon Insulation
- Bright Nickel Finish
- Fits WPC & WPD Plates
- Ground Lug Supplied
- Takes Less Room Behind the Plate

MODEL	Type	1-9	10-24	25-99
BAC-1417	BNC	3.95	3.75	3.48

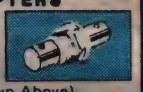
TNC BULKHEAD RECEPTACLE

- Teflon Insulation
- Bright Nickel Finish
- Fits WPC & WPD Plates
- Ground Lug Supplied
- Takes Less Room Behind the Plate

MODEL	Type	1-9	10-24	25-99
BAC-2200	TNC	3.95	3.75	3.48

BNC BULKHEAD ADAPTERS

- Teflon Insulation Inserts
- Bright Nickel Finish
- One Nut Mounting
- Accepts "Twist-on" BNC
- Fits WPC & WPD Plates (Shown Above)



MODEL	Type	1-9	10-24	25-99
BA-1087	BNC-BNC	6.80	6.46	5.98

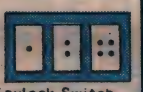
TNC BULKHEAD ADAPTERS

- Teflon Insulation Inserts
- Bright Nickel Finish
- One Nut Mounting
- Accepts "Screw-on" TNC
- Fits WPC & WPD Plates (Shown Above)

MODEL	Type	1-9	10-24	25-99
BA-2301	TNC-TNC	6.80	6.46	5.98

DATA WALL PLATES

- Stainless Looks Professional
- For 1, 2, or 4 Connectors
- Use with BNC or TNC
- Bulkhead Adapters/Jacks
- Also Accepts KMS Security Keylock Switch



MODEL	Cutouts	1-9	10-24	25-99
WPC-1	1	3.95	3.75	3.48
WPC-2	2	3.95	3.75	3.48
WPC-4	4	3.95	3.75	3.48

RS232 D-SUB CONNECTORS

- UL-90VO Insulation
- Solder Cup Connections
- Tin Plate Outer Finish
- Gold Plated Pin Provided
- For Easy Soldering & Good Conductivity

MODEL	Gender	1-9	10-24	25-99
SD25P-2	Male	2.95	2.80	2.60
SD25S-2	Female	3.85	3.66	3.39

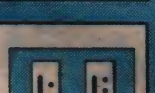
DATA WALL PLATES

- Professional Appearance
- Handsome Brushed Stainless
- Use with any RS-232 D-Sub
- Mounting Screws Supplied
- Eliminate Clutter and Increase Safety

MODEL	Cutouts	1-9	10-24	25-99
WPD-1	1	3.95	3.75	3.48
WPD-2	2	3.95	3.75	3.48

DATA WALL PLATES

- Accepts RS-232 D-Sub
- And Also BNC or TNC
- Bulkhead Connectors or
- Bulkhead Adapters (Below)
- Also Accepts KMS Security Keylock Switch



MODEL	Cutouts	1-9	10-24	25-99
WPD-3	2	3.95	3.75	3.48
WPD-4	3	3.95	3.75	3.48

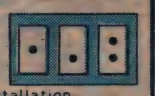
STAINLESS TELCO WALL PLATES

- Handsome Brushed Finish
- Accepts Telco Jack (Below)
- Top Half Left Blank For Custom Enhancement
- Eliminate Clutter and Increase Safety

MODEL	Cutouts	1-9	10-24	25-99
WPT	1	3.95	3.75	3.48

TWINAX WALL PLATES

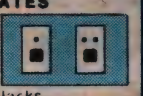
- Easy To Install
- Hole Size 3/4" Dia
- Handsome Brushed Stainless
- One or Two Twinax Jacks
- Professionalize Your IBM Installation



MODEL	Cutouts	1-9	10-24	25-99
WPC-10	1 (Ctr.)	3.95	3.75	3.48
WPC-11	1	3.95	3.75	3.48
WPC-12	2	3.95	3.75	3.48

TELCO-COAX WALL PLATES

- Professional Enhancement
- One or Two Coaxial Cables
- Accepts Telco Jack (Below)
- Use with BNC or TNC
- Either Bulkhead Adapters or Jacks



MODEL	Cutouts	1-9	10-24	25-99
WPT-1	2	3.95	3.75	3.48
WPT-2	3	3.95	3.75	3.48

TWINAX RECEPTACLE (Jack)

- Teflon Insulation
- Solder Connections
- One Hole Mounting
- IBM Accepted Standard
- Use With WPC Stainless Plate

MODEL	Type	1-9	10-24	25-99
BAC-1910	Twinax	9.95	9.45	8.76

TELEPHONE JACK

- Modular RJ-11 Jack
- Screw Terminals
- UL-94VO Plastic Material
- Fits WPT Stainless Plates
- Mounting Hardware Supplied

MODEL	Pins	1-9	10-24	25-99
TDD-20	4	2.95	2.80	2.60

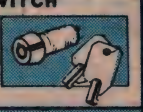
TWINAX ADAPTER

- Teflon Insulation
- A Useful Gender Changer
- Mates Two Male Twinax
- One Piece - Nickel Plate
- Keep One Handy In Your Tool Box

MODEL	Type	1-9	10-24	25-99
BA-2001	Twinax	12.95	12.30	11.40

SECURITY KEYLOCK SWITCH

- Bright Nickel Plate
- Fits WPC & WPD Plates
- Single Pole Single Throw
- 2 Tubular Keys Supplied
- Extra Keys Optional



MODEL	Function	1-9	10-24	25-99
KMS-02	SPST	6.95	6.60	6.12
KMS-K	Extra Key	.85	.81	.75

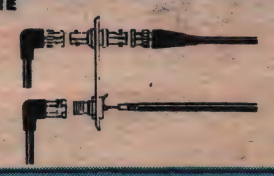
TWINAX CABLE CONNECTOR

- Teflon Insulation
- Machined From Solid Metal
- Use With RG-22U or Equal
- Long Trouble-free Operation
- Very Popular IBM Connector

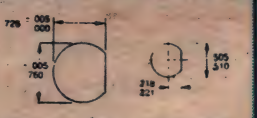
MODEL	Type	1-9	10-24	25-99
BAC-1911	Twinax	9.95	9.45	8.76

INSTALLATION PROCEDURE

- Orderly Connections
- Simple Installation
- Anti-Turn D Mounts
- BNC or TNC Connectors
- Use Preformed Cables
- Rt. Angle Contributes To A More Orderly Arrangement



PANEL CUTOUTS



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(1) Dual Drive Full Ht. Case	= 29.95
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(1) 3 Prong Power Cord	= 2.00
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(3') 34 Conductor Ribbon Cable @ .35/ft	= 1.05
(1) AC Power Switch	= .50
(1) Set Hardware, Hex Spacers, Strain Relief, etc.	= 1.50

TOTAL = ~~$240.00~~

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5 ¼" DSDD
Diskettes
Nashua
New, Unformatted
Hub Ring
10/$13.99

DB 25 - 5 ft.
Extender Cable
Fully-Pinned
F - F
M - F
$11.95

PC Parallel
Printer Cable
5 ft.
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"ITT Courier Keyboard"
Fully Cased — 82 keys
No Specs
Appears to be serial out
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$10.00
Contains 8048 or 8748 mpu

ASTEC Power Supply
#AC8151-01
+5V DC @ 2.5A
+12V DC @ 2.0A
-12V DC @ 0.1A
$20.00 115/230 input AC

Sprague
36DX9307 Powerlytic Capacitor 9,000 uf 50V DC — $2.00
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2708	$2.00
2516	$2.50
2716	$2.50
2532	$3.00
2732	$3.00
2732A	$3.50
2564	$4.00
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MORE!!!

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2102	9/$1.99
TMS4050	9/$2.99
TMS4060	9/$3.99
2114	9/$3.99
4116	9/$2.99
4164-150/200	9/$13.50
41256-150	9/$75.00

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MORE!!!

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7 Ft.
3 Prong-Open End
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10¢
1N4001 1N4002 1N4003 1N4004 1N4005 1N4006 1N4007

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18V-1W 24V-1W 5.1V-½W

IC Sockets Solder Tail

8,14,16,18 pin .....10¢
20,22 pin .....15¢
24,28 pin .....20¢
40 pin .....25¢

IC Sockets Wire-Wrap

8 pin .....40¢
14 pin .....65¢
16 pin .....65¢
18 pin .....90¢
20 pin $1.00
24 pin $1.25
28 pin $1.50
40 pin $1.75

Transformers

115V in / 15 VCT
60 cycle out @ 4½ amps
(Add $1.00 FRT.) **$7.50**

Antistatic Rails
.300 = 15¢
.600 = 20¢

Female Program Jumpers 10¢

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ITT DBP-25 PCA
Male 25 pin R/A PC MT.
"DB 25" **$3.00**

Capacitors

.01, .1uf Bypass .....10¢
.05uf 20V DISC .....5¢
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1uf 35V AXTANT .....10¢
47uf 50V AX/RAD ....15¢

Switches

8 Pos Dip ..... .35¢
SLIDE 2 or 3 pos.
125V, 1-5 amp .....25¢
TOGGLE Bat Handle
On-Off .....50¢

OTHERS!!

Connectors

4 pos. Power Connector
(Disc Drive 5¼") $1.00
Centronics 36 Pin Male
(Solder Tail).....$5.00
35 Pin C/E to Ribbon
(5¼" Disc Drive).....$3.50
40/80 Card Edge
.1 centers WW $3.00
50/100 Card Edge
.125 Centers WW $3.50
36/72 Card Edge
.1 Centers PC.....$2.00
22/44 Card Edge
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Resistors
¼ Watt, 5%

10	1K	56K
27	3.0K	91K
180	8.2K	100K
470	10K	150K
680	27K	220K
		560K

3¢ each
10 Piece Min. Per Device

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15 Digital IC's Asst.
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What the world really needs is a 99 cent Double Sided, Double Density Diskette with a LIFETIME WARRANTY!

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Introducing Super Star Diskettes: the high quality diskette with the lowest price and the best LIFETIME WARRANTY!

In the course of selling more than a million diskettes every month, we've learned something: higher prices don't necessarily mean higher quality.

In fact, we've found that a good diskette manufacturer simply manufactures a good diskette...no matter what they charge for it. (By way of example, consider that none of the brands that we carry has a return rate of greater than 1/1,000th of 1 percent!)

In other words, when people buy a more expensive diskette, they aren't necessarily buying higher quality.

The extra money might be going toward flashier advertising, snazzier packaging or simply higher profits.

But the extra money in a higher price isn't buying better quality.

All of the good manufacturers put out a good diskette. Period.

How to cut diskette prices ...without cutting quality.

Now this discovery posed a dilemma: how to cut the price of diskettes without lowering the quality.

There are about 85 companies claiming to be "diskette" manufacturers.

Trouble is, most of them aren't manufacturers.

Rather they are fabricators or marketers, taking other company's components, possibly doing one or more steps of the processing themselves and pasting their labels on the finished product.

The new Eastman Kodak diskettes, for example, are one of these. So are IBM 5¼" diskettes. Same for DYSAN, Polaroid and many, many other familiar diskette brand names. Each of these diskettes is manufactured in whole or in part by another company!

So, we decided to act just like the big guys. That's how we would cut diskette prices...without lowering the quality.

We would go out and find smaller companies to manufacture a diskette to our specifications...specifications which are higher than most...and simply create our own "name brand" diskette.

Name brand diskettes that offered high quality at low prices.

Super Star diskettes are sold in multiples of 50 only. Diskettes are shipped with white Tyvec sleeves, reinforced hubs, user ID labels and write-protect tabs.

Boy, did we get lucky. Our Super Star Diskettes are the same ones you've been using for years...without knowing it.

In our search for the low priced, high quality diskette of our dreams, we found something even more interesting.

We found that there are several manufacturers who don't give a hoot about the consumer market for their diskettes. They don't spend millions of dollars in advertising trying to get you, the computer user, to use their diskettes.

Instead, they concentrate their efforts on turning out the highest quality diskettes they can...because they sell them to the software publishers, computer manufacturers and other folks who (in turn) put their name on them...and sell them for much higher prices to you!

After all, when a software publisher or computer manufacturer or diskette marketer puts their name on a diskette, they want it to work time after time, everytime. (Especially software publishers who have the nasty habit of copy-protecting their originals!)

Super Star Diskettes. You already know how good they are. Now you can buy them...cheap.

Well, that's the story.

Super Star diskettes don't roll off the boat from Pago-Pago or emerge from a basement plant just east of Nowhere.

Super Star diskettes have been around for years...and you've used them for years as copy-protected software originals, unprotected originals. Sometimes, depending on which computer you own, the system master may have been on a Super Star diskette. And maybe more than once, you've bought a box or two or more of Super Star diskettes without knowing it. They just had some "big" company's name on them.

Super Star Diskettes are good. So good that a lot of major software publishers, computer manufacturers and other diskette marketers buy them in the tens or hundreds of thousands.

We buy them in the millions.

And than we sell them to you.

Cheap.

When every little bit counts, it's Super Star Diskettes.

You've used them a hundred times...under different names.

Now, you can buy the real McCoy, the same diskette that major software publishers, computer manufacturers and diskette marketers buy...and call their own.

We simply charge less.

Super Special!

Order 50 Super Star Diskettes and we'll be happy to sell you an Amaray Media-Mate 50 for only $8.75, shipping included...a lot less than the suggested retail price of $15.95.

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Terrific! Holds 10 5¼" diskettes. Just flip the lever and they all slide up for easy access and identification. Grey with smoked plastic front.
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FOR FASTEST SERVICE, USE NO-COST MCI MAIL: Our address is DISKWORLD. It's a FREE MCI MAIL letter. No charge to you. (Situation permitting, we'll ship these orders in 24 hours or less.)

SHIPPING: 5¼" & 3½" DISKETTES—Add $3.00 per each 100 or fewer diskettes. **OTHER ITEMS:** Add shipping charges as shown in addition to other shipping charges. **PAYMENT:** VISA, MASTERCARD and Prepaid orders accepted. **COD ORDERS:** Add additional $3.00 special handling charge. **APO, FPO, AK, HI & PR ORDERS:** Include shipping charges as shown and additional 5% of total order amount to cover PAL and insurance. We ship only to United States addresses, except for those listed above. **TAXES:** Illinois residents, add 8% sales tax.

MINIMUM ORDER: $35.00 or 20 diskettes.

The Super Star LIFETIME WARRANTY!

Super Star Diskettes are unconditionally warranted against defects in original material and workmanship so long as owned by the original purchaser. Returns are simple: just send the defective diskettes with proof of purchase, postage-paid by you with a short explanation of the problem, and we'll send you the replacements. (Incidentally, coffee stained diskettes and diskettes with staples driven through them don't qualify as "defective".)

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WE WILL MEET OR BEAT ANY NATIONALLY ADVERTISED PRICE ON THE SAME PRODUCTS AND QUANTITIES SUBJECT TO THE SAME TERMS AND CONDITIONS.

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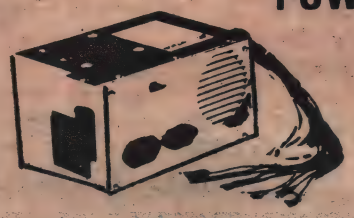
CASE

$79

- Open from top for easy and quick access to inside.
- Can be used for Mega board or standard IBM PC/XT MB.
- Metal case
- Quality guaranteed

POWER SUPPLY 135 W



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- 4 Drives Power Plugs
- Side Switch model has some dimensions & power plug as IBM power supply.
- Back switch model can fit Mega case perfectly.

FOR IBM

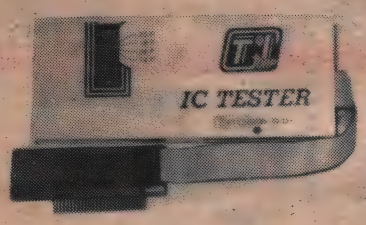
- Prototyping Board Standard Size $12.00

JOY-STICK FOR APPLE

$34

- Manu-Auto Switch

I.C. TESTER FOR APPLE



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- 80-Column expandable video card for **Apple IIe**
- **64K RAM, expandable**

- Double High-resolution circuit
- Compatible with Pascal & CP/M $59.00

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- 80 x 25 Text Mode (Default)
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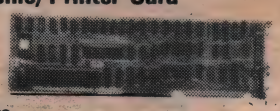
- Can Run Lotus 1-2-3
- 64K Graphic Display Memory
- 18 KHz Monitor and Printer Interface



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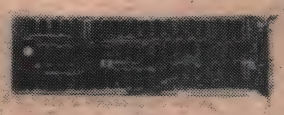
Color/Graphic/Printer Card

- RGB Color Port and Parallel Port For Printer
- Light Pen Interface
- Graphic Mode:
  320 Dots x 200 Lines Color
  640 Dots x 200 Lines B/W
- Text Mode:
  40 Columns x 25 Rows Color / B/W
  80 Columns x 25 Rows Colors / B/W



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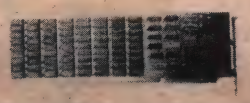
MONTH SPECIAL!!!

512K RAM Card

- From 64K to 512K
- Boundary and Total Memory

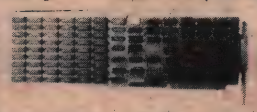
$109 (64K on Board)



Multifunction Card, Expandable to 384K

- From 64 to 384K
- 1 RS-232C, 1 Centronics Printer Ports

$169 (64K on Card)



MONTH SPECIAL!!!

Floopy Disk Controller

- Drives 4 x 5¼" FDD
- IBM fully compatible

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RS232/Parallel Printer Port Card

Fully IBM Compatible

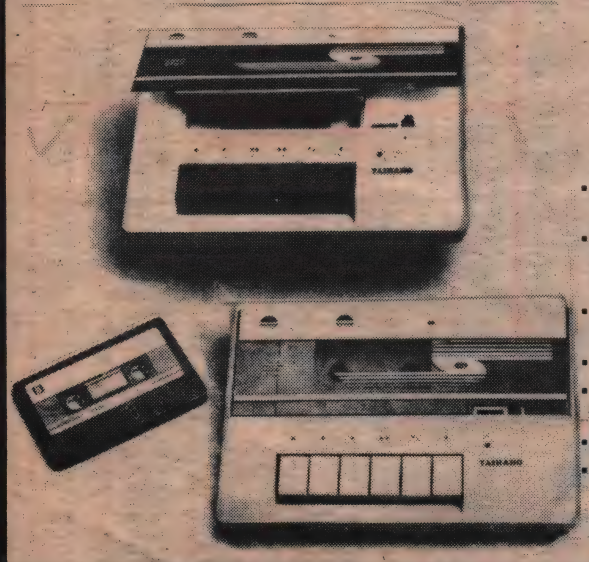
$39

SPECIAL PRICE $169 FOR IBM compatible system.

Disk I/O Card, 1 Serial, Parallel, Game Port, Real-time Clock, and Disk Driver Controller.

COMPUTER CASSETTE DATA RECORDER

For use with almost all personal computers
Apple™, BBC™, Canon™
Casio™, Commodore™, Olivetti™, Atari™
Tandy™(Radio Shack), Sinclair™(Timex™), etc...



Computer Data Cassette Model

- Model 603A for Solution I, Apple, BBC, Sinclair, Casio, Sharp, Canon
  - 603B for Radio shack
  - 603C for Commodore
  - 603D for Atari
  - 603E for Olivetti
  - 603F for Thomson home computer
  - 603G for Oric home computer
  - 603H for BBC computer
- When order, please specify the name of computer to which you want connect with
- Complete with all cables and hook-up hardware, with an easy-to-follow instruction and operation manual
- Power source: DC 6V
  AC 110V or 220V
- Contains Save Indicator & Location Counter
- Dimension: 215mm x 150mm x 52mm
  240mm x 200mm x 75mm (Package)
- Net weight: 850 gs
- Gross weight: 1000 gs

$49.95

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Z-80 Card for II, II+, IIe	$45
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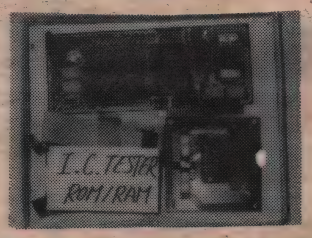
16K Ram Card for II, II+	35
80 Column Card (Videx Type)	48
128K Ram Card	120
Buffer Printer Memory Card 16K	99
Epson Printer Interface Card W/Cable	35
EPROM Programmer (program 2716, 2732, 2764)	55
RS-232 Card	40
Speech Card W/Software and Manual	35
Super Serial Card	95
Wild Card W/Manual	49
Softwitch for Videx 80 Column Card	10
Clock Card	59
I.C. Tester Burn-In or Identify Eprom, Prom Eprom 2716, 2732, 2764 W/Software Ram 4164	149



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7400

Part No.	Pins	Price
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SN7402N	14	.29
SN7403N	14	.29
SN7404N	14	.35
SN7405N	14	.49
SN7406N	14	.59
SN7407N	14	.59
SN7408N	14	.29
SN7409N	14	.35
SN7410N	14	.29
SN7411N	14	.29
SN7412N	14	.49
SN7413N	14	.39
SN7414N	14	.49
SN7416N	14	.49
SN7417N	14	.59
SN7420N	14	.19
SN7421N	14	.59
SN7422N	14	.59
SN7423N	16	.69
SN7425N	14	.39
SN7426N	14	.39
SN7427N	14	.25
SN7428N	14	.59
SN7430N	14	.35
SN7432N	14	.39
SN7433N	14	.49
SN7437N	14	.25
SN7438N	14	.49
SN7439N	14	.79
SN7440N	14	.19
SN7441N	16	.89
SN7442N	16	.45
SN7443N	16	1.25
SN7444N	16	1.25
SN7445N	16	.69
SN7446N	16	.75
SN7447N	16	.75
SN7448N	16	.75
SN7454N	14	.19
SN7459N	14	.35
SN7460N	14	.39
SN7470N	14	.39
SN7472N	14	.39
SN7473N	14	.39
SN7474N	14	.39
SN7475N	16	.45
SN7476N	16	.39
SN7479N	14	4.95
SN7480N	14	.89
SN7482N	14	1.49
SN7483N	16	.55
SN7485N	16	.59
SN7486N	14	.39
SN7489N	16	2.25
SN7490N	14	.49
SN7491N	14	.79
SN7492N	14	.45
SN7493N	14	.45
SN7494N	14	.89
SN7495N	14	.49
SN7496N	16	.49
SN7497N	16	3.25
SN74100N	24	1.95
SN74105N	14	1.19
SN74107N	14	.29
SN74109N	16	.39
SN74116N	24	1.49
SN74121N	14	.45
SN74122N	14	.69
SN74123N	16	.55
SN74125N	14	.49
SN74126N	14	.49
SN74128N	14	.79
SN74132N	14	.59
SN74136N	14	.69
SN74141N	16	.89
SN74142N	16	3.95
SN74143N	24	3.95
SN74144N	24	3.95
SN74145N	16	.65
SN74147N	16	1.29
SN74148N	16	.89
SN74150N	24	1.49
SN74151N	16	.49
SN74152N	14	.49
SN74153N	16	.99
SN74154N	24	1.49
SN74155N	16	.49
SN74156N	16	.59
SN74157N	16	.49
SN74159N	24	1.95
SN74160N	16	.59
SN74161N	16	.59
SN74162N	16	.59
SN74163N	16	.59
SN74164N	14	.69
SN74165N	16	.69
SN74166N	16	.69
SN74167N	16	2.95
SN74170N	16	1.59
SN74172N	24	4.95
SN74173N	16	.85
SN74174N	16	.59
SN74175N	16	.59
SN74176N	14	.79
SN74177N	14	.79
SN74179N	16	1.49
SN74180N	14	.69
SN74181N	24	1.95
SN74182N	16	1.05
SN74184N	16	2.29
SN74185N	16	2.29
SN74190N	16	.69
SN74191N	16	.69
SN74192N	16	.69
SN74193N	16	.69
SN74194N	16	.69
SN74195N	16	.49
SN74196N	14	.75
SN74197N	14	.75
SN74198N	24	1.19
SN74199N	24	1.19
SN74221N	16	1.19
SN74251N	16	.79
SN74273N	20	1.95
SN74276N	20	2.49
SN74279N	16	.79
SN74283N	16	1.39
SN74284N	16	2.95
SN74285N	16	2.95
SN74365N	16	.55
SN74366N	16	.55
SN74367N	16	.55
SN74368N	16	.55
SN74390N	16	1.49
SN74393N	14	1.49

74LS

Part No.	Pins	Price
74LS00	14	.29
74LS01	14	.29
74LS02	14	.35
74LS03	14	.29
74LS04	14	.39
74LS05	14	.35
74LS08	14	.35
74LS09	14	.35
74LS10	14	.35
74LS11	14	.35
74LS14	14	.59
74LS15	14	.35
74LS20	14	.29
74LS21	14	.35
74LS26	14	.29
74LS27	14	.35
74LS28	14	.39
74LS30	14	.39
74LS32	14	.39
74LS37	14	.35
74LS38	14	.39
74LS42	16	.49
74LS47	16	.89
74LS51	14	.29
74LS73	14	.39
74LS74	14	.49
74LS75	16	.45
74LS76	16	.39
74LS85	16	.89
74LS86	14	.39
74LS90	14	.55
74LS92	14	.55
74LS93	14	.59
74LS96	16	.89
74LS107	14	.39
74LS109	16	.39
74LS112	16	.45
74LS114	14	.39
74LS122	14	.49
74LS123	16	.79
74LS125	14	.59
74LS126	14	.59
74LS132	14	.65
74LS133	16	.59
74LS136	14	.39
74LS138	16	.59
74LS139	16	.59
74LS145	16	1.19
74LS147	16	1.95
74LS148	16	1.79
74LS151	16	.59
74LS153	16	.59
74LS154	24	1.49
74LS155	16	.69
74LS156	16	.69
74LS157	16	.69
74LS158	16	.59
74LS160	16	.69
74LS161	16	.69
74LS162	16	.69
74LS163	16	.69
74LS164	14	.89
74LS165	16	.89
74LS168	16	1.19
74LS169	16	1.49
74LS170	16	1.49
74LS173	16	.69
74LS174	16	.69
74LS175	16	.69
74LS181	24	2.49
74LS190	16	.79
74LS191	16	.89
74LS192	16	.79
74LS193	16	.89
74LS194	16	.69
74LS195	16	.59
74LS196	14	.89
74LS197	14	.89
74LS221	16	1.09
74LS240	20	1.09
74LS241	20	.99
74LS243	14	1.09
74LS244	20	1.29
74LS245	20	1.49
74LS251	16	.59
74LS253	16	.59
74LS257	16	.59
74LS258	16	.59
74LS260	14	.59
74LS266	14	.49
74LS273	20	1.49
74LS279	16	.49
74LS280	14	1.95
74LS299	20	2.95
74LS322	20	3.95
74LS323	20	3.95
74LS347	16	.79
74LS353	16	1.09
74LS364	20	1.95
74LS365	16	.49
74LS366	16	.49
74LS367	16	.49
74LS368	16	.49
74LS373	20	1.49
74LS374	20	1.49
74LS375	16	.69
74LS386	14	.39
74LS393	14	1.19
74LS399	16	1.49
74LS490	16	1.95
74LS533	20	1.95
74LS534	20	1.95
74LS540	20	1.49
74LS541	20	1.49
74LS640	20	2.19
74LS641	20	2.19
74LS644	20	2.19
74LS645	20	2.19
74LS670	16	1.49
74LS688	20	2.95
81LS95	20	1.49
81LS96	20	1.49
81LS97	20	1.49
81LS98	20	1.49

74S/PROMS*

Part No.	Pins	Price
74S00	14	.35
74S02	14	.35
74S03	14	.35
74S04	14	.45
74S05	14	.45
74S08	14	.45
74S09	14	.39
74S10	14	.35
74S11	14	.35
74S15	14	.35
74S20	14	.35
74S22	14	.35
74S30	14	.35
74S32	14	.45
74S37	14	.99
74S38	14	.89
74S51	14	.35
74S64	14	.39
74S65	14	.39
74S74	14	.55
74S85	16	1.99
74S86	14	.55
74S112	16	.55
74S113	14	.55
74S114	14	.55
74S124	16	2.75
74S132	14	1.89
74S133	16	.45
74S135	16	.89
74S136	14	1.39
74S138	16	.89
74S139	16	.89
74S140	14	.69
74S151	16	.99
74S153	16	.99
74S157	16	.99
74S158	16	.99
74S160	16	2.29
74S169	16	4.29
74S174	16	1.09
74S175	16	1.09
74S188*	16	1.75
74S194	16	1.49
74S195	16	1.49
74S196	14	1.49
74S240	20	1.95
74S241	20	1.95
74S242	14	2.19
74S243	14	2.19
74S244	20	2.19
74S251	16	.99
74S253	16	.99
74S257	16	.99
74S258	16	.99
74S260	14	.79
74S273	20	2.39
74S280	14	1.89
74S287*	16	1.79
74S288*	16	1.79
74S299	20	5.95
74S373	20	2.49
74S374	20	2.49
74S387*	16	1.95
74S471*	20	4.95
74S472*	20	4.95
74S473*	20	4.95
74S570*	16	2.95
74S571*	16	2.95
74S572*	18	4.95
74S573*	18	4.95

CA—LINEAR

Part No.	Pins	Price
CA3046N	14	.99
CA3054N	14	1.09
CA3059N	14	2.95
CA3060N	16	2.95
CA3065E	14	1.49
CA3080E	8	.99
CA3081N	16	1.15
CA3082N	16	1.15
CA3083N	16	1.15
CA3086N	14	.85
CA3089N	16	1.95
CA3096N	16	1.75
CA3127E	16	1.95
CA3130E	8	1.19
CA3140E	8	.85
CA3160H		1.79
CA3160E	8	1.49
CA3161E	16	1.79
CA3162E	16	6.95
CA3189E	16	2.79
CA3401N	14	.59

CD—CMOS

Part No.	Pins	Price
CD4000	14	.29
CD4001	14	.29
CD4002	14	.29
CD4006	14	.89
CD4007	14	.29
CD4008	16	.89
CD4009	16	.59
CD4010	16	.49
CD4011	14	.29
CD4012	14	.29
CD4013	14	.39
CD4014	16	.89
CD4015	16	.39
CD4016	14	.49
CD4017	16	.79
CD4018	16	.79
CD4019	16	.49
CD4020	16	.75
CD4021	16	.75
CD4022	16	.75
CD4023	14	.29
CD4024	14	.69
CD4025	14	.29
CD4026	16	1.59
CD4027	16	.45
CD4028	16	.69
CD4029	16	.79
CD4030	14	.39
CD4034	24	1.79
CD4035	16	.79
CD4040	16	.75
CD4041	14	.69
CD4042	16	.69
CD4043	16	.79
CD4044	16	.79
CD4046	16	.89
CD4047	14	.89
CD4048	16	.59
CD4049	16	.39
CD4050	16	.39
CD4051	16	.79
CD4052	16	.89
CD4053	16	.79
CD4056	16	2.95
CD4059	24	3.95
CD4060	16	.89
CD4066	14	.45
CD4068	14	.39
CD4069	14	.35
CD4070	14	.29
CD4071	14	.29
CD4072	14	.29
CD4073	14	.29
CD4075	14	.29
CD4076	16	.89
CD4077	14	.35
CD4078	14	.49
CD4081	14	.29
CD4093	14	.49
CD4094	16	1.95
CD4098	16	1.95
CD4099	16	1.89
CD4503	16	.69
CD4506	16	1.29
CD4507	14	1.19
CD4508	24	1.95
CD4510	16	.85
CD4511	16	.85
CD4512	16	.85
CD4514	24	1.49
CD4515	24	1.49
CD4516	16	.89
CD4518	16	.89
CD4519	16	.59
CD4520	16	.89
CD4526	16	1.19
CD4528	16	1.19
CD4529	16	1.69
CD4531	16	.89
CD4538	16	1.49
CD4541	14	1.49
CD4543	16	1.19
CD4566	16	2.95
CD4583	16	2.49
CD4584	14	.59
CD4585	16	1.39
CD4723	16	1.19
CD4724	16	1.19
MC14410	16	8.95
MC14411	24	11.95
MC14412	16	7.95
MC14433	24	17.95
MC14490P	16	4.95
MC14572	16	1.19

RED-HOT RAM & EPROM PRICES

Part No.	Description	Price
21C14	(200ns) CMOS SRAM CMOS USES LESS POWER	.99
27C16	(450ns) CMOS EPROM	9.95
4164N-200	(DRAM)	2.25-9/19.95
6116P-4	(200ns) SRAM	3.49
6116LP-4	(200ns) L.P. SRAM	3.69
6264P-15	(150ns) SRAM	12.49
6264LP-15	(150ns) L.P. SRAM	12.95
27128-25	(250ns) EPROM	9.95
41256-200	(200ns) DRAM	8.95
68764	(450ns) 21V EPROM	12.95
EWC-1	EPROM Window Covers	10/.69

MICROPROCESSOR COMPONENTS

MICROPROCESSOR CHIPS

Part No.	Pins	Function	Price
D765AC	40	Floppy Disk Controller	16.95
D3242	28	Addr. Multiplexer & Refresh Counter	7.95
TMS5501	40	Synchronous Data Interface (SIRC)	14.95

Z80, Z80A, Z80B, Z8000 SERIES

Part No.	Pins	Function	Price
Z80	40	CPU (MK3880N) (780C) 2.5MHz	2.75
Z80-CTC	28	Counter Timer Circuit	3.49
Z80-DART	40	Dual Asynchronous Rec./Trans.	8.95
Z80-DMA	40	Direct Memory Access Circuit	12.49
Z80-P10	40	Parallel I/O Interface Controller	2.95
Z80-S10/0	40	Serial I/O (TxCB and RxCB Bonded)	11.49
Z80-S10/1	40	Serial I/O (Lacks DTRB)	11.49
Z80-S10/2	40	Serial I/O (Lacks SYNCB)	11.49
Z80-S10/9	40	Serial I/O	11.49
Z80A	40	CPU (MK3880N-4) (780C-1) 4MHz	2.95
Z80A-CTC	28	Counter Timer Circuit	3.95
Z80A-DART	40	Dual Asynchronous Rec./Trans.	9.95
Z80A-DMA	40	Direct Memory Access Circuit	12.95
Z80A-P10	40	Parallel I/O Interface Controller	3.95
Z80A-S10/0	40	Serial I/O (TxCB and RxCB Bonded)	11.95
Z80A-S10/1	40	Serial I/O (Lacks DTRB)	11.95
Z80A-S10/2	40	Serial I/O (Lacks SYNCB)	11.95
Z80A-S10/9	40	Serial I/O	11.95
Z80B	40	CPU (MK3880N-6) 6MHz	8.95
Z80B-CTC	28	Counter Timer Circuit	11.95
Z80B-DART	40	Dual Asynchronous Rec./Trans.	19.95
Z80B-P10	40	Parallel I/O Interface Controller	10.95

6500/6800/68000 SERIES

Part No.	Pins	Function	Price
6502	40	MPU with Clock (1MHz)	4.95
6502A	40	MPU with Clock (2MHz)	5.25
6502B	40	MPU with Clock (3MHz)	7.95
6520	40	Peripheral Inter. Adapter	2.75
6522	40	Versatile Inter. Adapter	4.95
6551	28	Async. Comm. Interface Adapt.	6.95
6800	40	MPU	2.95
6802	40	MPU with Clock and RAM	5.95
6809	40	CPU — 8-Bit (On-Chip Oscillator)	6.95
6809E	40	CPU — 8-Bit (External Clocking)	8.49
68B09E	40	CPU — 8-Bit (Ext. Clocking) 2MHz	11.49
6810	24	128x8 Static RAM	2.75
68B10	24	128x8 Static RAM (2MHz)	5.95
6821	40	Peripheral Inter.Adapt.(MC6820)	2.75
68B21	40	Peripheral Interface Adapter (2MHz)	4.95
6845	40	CRT Controller (CRTC)	9.95
68B45	40	CRT Controller (CRTC) 2MHz	14.95
6850	24	Asynchronous Comm. Adapter	2.95
6860	24	0-600bps Digital MODEM	6.95
68000L8	64	MPU 16-Bit (8MHz)	34.95
68488P	40	General Purpose Int. Adapter	9.95
68661	28	Enhanced Prog. Comm. Interface (2661)	8.95

8000/80000 SERIES

Part No.	Pins	Function	Price
8031	40	Control Oriented CPU w/RAM & I/O	12.95
8035	40	MPU — 8-Bit	4.95
8039	40	CPU—Sgl. Chip 8-Bit (128bts. RAM)	4.95
8040N-6	40	CPU (256 bytes RAM)	9.95
8060	40	CPU — 8-Bit NMOS	12.95
8073N	40	CPU w/Basic Micro Interpreter	29.95
8080A	40	CPU	3.95
8085A	40	CPU	3.95
8085A-2	40	CPU-8-Bit N-Channel (5MHz)	10.95
8086-2	40	CPU 16-bit 8MHz	19.95
8087	40	Arithmetic Processor (5MHz)	129.95
8087-2	40	Arithmetic Processor (8MHz)	159.95
8088	40	CPU 8/16-Bit	14.95
8155	40	HMOS RAM I/O Port-Timer	4.95
8156	40	RAM with I/O Port and Timer	5.95
8205	16	Hi Speed 1 out of 8 Binary Decoder	3.95
8212	24	8-Bit Input/Output (74S412)	2.25
8224	16	Clock Generator/Driver	2.69
8228	28	Sys. Cont./Bus Driver (74S428)	3.95
8237-5	40	High Perf. Prog. DMA Cont. (5MHz)	12.95
8238	28	System Controller (74S438)	4.95
8243	24	I/O Expander for 48 Series	3.95
8250N	40	Async. Comm. Element	9.95
8251	28	Prog. Comm. I/O (USART)	3.25
8251A	28	Prog. Comm. Interface (USART)	3.49
8253-5	24	Prog. Interval Timer	6.49
8255	40	Prog. Peripheral I/O (PPI)	3.95
8255A-5	40	Prog. Peripheral I/O (PPI) 5MHz	4.25
8257-5	40	Prog. DMA Controller	6.95
8259	28	Prog. Interrupt Control	5.95
8259-5	28	Prog. Interrupt Controller	6.95
8272	40	Sgle/Dble Density Floppy Disk Cont.	16.95
8274	40	Multi-Protocol Serial Cont. (7201)	14.95
8275	40	Prog. CRT Controller	14.95
8279	40	Prog. Keyboard/Display Interface	5.49
8279-5	40	Prog. Keyboard/Display Interface	5.95
8282	20	Octal Latch	6.49
8284	18	Clock Generator/Driver	5.49
8286	20	Octal Bus Transceiver	6.49
8287	20	Octal Bus. Transceiver (Inverted)	6.49
8288	20	Bus Controller	13.95
8289	20	Bus Arbiter	24.95
8741	40	8-Bit Univ. Peripheral Interface	19.95
8748	40	HMOS EPROM MPU	19.95
8749	40	MPU 8-Bit (EPROM Version of 8049)	24.95
8755	40	16K EPROM with I/O	39.95
80186-6	68	High Integration 16-Bit MPU	49.95
80188	68	High Integra. 16-Bit MPU (8-Bit Data Bus)	49.95

SPECIAL FUNCTION

Part No.	Pins	Function	Price
MC3470P	18	Floppy Disk Read Amp System	4.95
MM5321N	16	TV Camera Sync. Generator	9.95
MM58167AN	24	Microprocessor Real Time Clock	8.95
MM58174AN	16	Micro. Compatible Time Clock	8.95
MM5369AA/N	8	Prog. Oscillator/Divider (60Hz)	1.79
MM5369EST	8	Prog. Oscillator/Divider (100Hz)	1.95

DYNAMIC RAMS

Part No.	Pins	Function		Price
1103	18	1024x1	(300ns)	.99
4027	16	4096x1	(250ns)	1.49
4116N-15	16	16,384x1	(150ns)	1.39 — 8/10.95
4116N-20	16	16,384x1	(200ns)	.79-8/6.29
4116N-25	16	16,384x1	(250ns)	.69-8/5.49
4164N-150	16	65,536x1	(150ns)	2.49-9/21.95
4164N-200	16	65,536x1	(200ns)	2.25-9/19.95
MM5261	18	1024x1	(300ns)	.35 — 8/1.95
MM5262	22	2048x1	(365ns)	.35 — 8/1.95
MM5270	18	4096x1	(250ns)	4.95
MM5280	22	4096x1	(200ns) 2107	3.95
MM5298-3	16	8192x1	(200ns)	.59
41256-150	16	262,144x1	(150ns)	9.95
41256-200	16	262,144x1	(200ns)	8.95
4128	16	131,072x1	(250ns)	14.95

STATIC RAMS

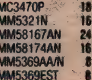
Part No.	Pins	Function		Price
2101	22	256x4	(450ns) 8101	1.95
2102	16	1024x1	(350ns)	.89
2102-2L	16	1024x1	(250ns) L.P. (91L02)	1.49
2111	18	256x4	(450ns) 8111	2.49
2112	16	256x4	(450ns) MOS	2.49
2114N	18	1024x4	(450ns)	1.29 — 8/9.95
2114N-L	18	1024x4	(450ns) L.P.	1.65 — 8/12.95
2114N-2	18	1024x4	(200ns)	1.39 — 8/10.95
2114N-2L	18	1024x4	(200ns) L.P.	1.69 — 8/13.49
2147HN	18	4096x1	(70ns)	4.49
2148HN	18	1024x4	(70ns)	4.95
TMS4045	18	1024x4	(450ns)	3.95
TMS40L47-45	20	1024x4	(450ns)	1.95
5101	22	256x4	(450ns) CMOS	2.95
MM5257	18	4096x1	(450ns) 4044	4.95
HM6116P-2	24	2048x8	(120ns) CMOS	4.95
HM6116LP-2	24	2048x8	(120ns) L.P. CMOS	6.49
HM6116P-3	24	2048x8	(150ns) CMOS	3.75
HM6116LP-3	24	2048x8	(150ns) L.P. CMOS	3.95
HM6116P-4	24	2048x8	(200ns) CMOS	3.49
HM6116LP-4	24	2048x8	(200ns) L.P. CMOS	3.69
HM6264P-12	28	8192x8	(120ns) CMOS	14.49
HM6264LP-12	28	8192x8	(120ns) L.P. CMOS	14.95
HM6264P-15	28	8192x8	(150ns) CMOS	12.49
HM6264LP-15	28	8192x8	(150ns) L.P. CMOS	12.95
27LS00	16	256x1	(80ns) L.P.	3.95
7489	16	16x4	(50ns) 3101	2.25
74C921	18	256x4	(250ns) CMOS	5.95
74C930	18	1024x1	(250ns) CMOS (6518)	5.95
74S189	16	16x4	(35ns) 93405	2.95
74S289	16	16x4	(35ns) 3101	2.95
82S10	16	1024x1	(50ns) O.C. (93415)	3.95
82S25	16	16x4	(50ns) O.C. (74S289)	2.25

PROMS/EPROMS

Part No.	Pins	Function		Price
1702A	24	256x8	(1μs)	3.95
TMS2516	24	2048x8	(450ns)	4.95
TMS2532	24	4096x8	(450ns)	5.49
TMS2564	28	8192x8	(450ns)	10.95
2708	24	1024x8	(450ns)	3.95
TMS2716	24	2048x8	(450ns) 3 voltage	7.95
2716	24	2048x8	(450ns)	3.95
27C16	24	2048x8	CMOS	9.95
2716-1	24	2048x8	(350ns)	4.95
27160-5	24	2048x8	(550ns)	3.75
2732	24	4096x8	(450ns)	4.25
2732A-20	24	4096x8	(200ns) 21V	9.95
2732A-25	24	4096x8	(250ns) 21V	5.95
2732A-45	24	4096x8	(450ns) 21V	4.49
27C32	24	4096x8	CMOS	11.95
27C32A-30	24	4096x8	(300ns) 21V (CMOS)	22.95
2764-20	28	8192x8	(200ns) 21V	6.95
2764-25	28	8192x8	(250ns) 21V	5.09
2764-45	28	8192x8	(450ns) 21V	4.95
27C64	28	8192x8	CMOS 21V	11.95
27128-25	28	16,384x8	(250ns) 128K 21V	9.95
27256-25	28	32,768x8	(250ns) 256K (14V)	19.95
MCM68764	24	8192x8	(450ns) 21V	12.95
74S188	16	32x8	PROM O.C. (6330-1)	1.75
74S287	16	256x4	PROM T.S. (6301-1)	1.79
74S288	16	32x8	PROM T.S. (6331-1)	1.79
74S387	16	256x4	PROM O.C. (6300-1)	1.95
74S471	20	256x8	PROM T.S. (6309-1)	4.95
74S472	20	512x8	PROM T.S. (6349-1)	4.95
74S473	20	512x8	PROM O.C. (6348)	4.95
74S474	24	512x8	PROM T.S. (DM87S296N)	4.95
74S475	24	512x8	PROM O.C. (6340)	4.95
74S476	18	1024x4	PROM T.S.	6.95
74S478	24	1024x8	PROM T.S.	9.95
74S570	16	512x4	PROM O.C. (6305)	2.95
74S571	16	512x4	PROM T.S. (6306)	2.95
74S572	18	1024x4	PROM O.C. (6352)	4.95
74S573	18	1024x4	PROM T.S. (82S137)	4.95
82S23	16	32x8	PROM O.C. (27S18)	2.95
82S115	24	512x8	PROM T.S. (27S15)	9.95
82S123	16	32x8	PROM T.S. (27S19)	2.95
82S126	16	256x4	PROM O.C. (27S20)	2.95
82S129	16	256x4	PROM T.S. (27S21)	2.95
82S130	16	512x4	PROM O.C. (27S12)	3.95
82S185	18	2048x4	PROM T.S. (TBP24S81)	9.95
82S191	24	2048x8	(80ns)	14.95
DM87S181N	24	1024x8	PROM T.S. (82S181)	9.95
DM87S184N	18	2048x4	PROM O.C. (82S184)	9.95
DM87S185N	18	2048x4	PROM T.S. (82S185)	9.95
DM87S191N	24	2048x8	PROM T.S. (82S191)	14.95

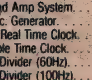
DATA ACQUISITION

Part No.	Pins	Function	Price
DC10		Mostek DC/DC Converter +5V to −9V	2.95
ADC0801	20	8-Bit A/D Converter (1/4LSB)	14.95
ADC0803	20	8-Bit A/D Converter (±1/2LSB)	4.95
ADC0804	20	8-Bit A/D Converter (1LSB)	3.49
ADC0808	28	8-Bit A/D Conv. w/8-Channel Analog	9.95
ADC0809	28	8-Bit A/D Converter (8-Ch. Multi.)	4.49
ADC0816	40	8-Bit A/D Conv. w/16-Channel Analog	14.95
ADC0817	40	8-Bit A/D Converter (16-Ch. Multi.)	9.49
DAC0806	16	8-Bit D/A Converter (0.78% Lin.)	1.95
DAC0807	16	8-Bit D/A Converter (MC1408-7)	1.49
DAC0808	16	8-Bit D/A Converter (MC1408-8)	2.25
DAC0830	20	8-Bit Up D/A Conv. (.05% Lin.)	5.95
DAC0831	20	8-Bit Up D/A Conv. (.10% Lin.)	4.49
DAC1000	24	10-Bit D/A Conv. Micro. Comp. (0.05%)	7.95
DAC1008	20	10-Bit D/A Conv. Micro. Comp. (0.20%)	6.95
DAC1022	16	10-Bit D/A Conv. (0.20% lin.)	5.95
DAC1222	18	12-Bit D/A Conv. (0.20% Lin.)	6.95
DAC1230	20	12-Bit Up D/A Conv. (.05% Lin.)	14.95
DAC1231	20	12-Bit Up D/A Conv. (.10% Lin.)	13.95
AY-3-1015D	40	25K Baud UART	4.25
AY-5-1013A	40	30K Baud UART (TR1602)	3.95



Low Profile (Tin) Sockets

Part No.	1-9	10-99	100-up
8 pin LP	.16	.14	.13
14 pin LP	.17	.15	.14
16 pin LP	.19	.17	.16
18 pin LP	.26	.24	.23
20 pin LP	.30	.27	.25
22 pin LP	.31	.28	.26
24 pin LP	.33	.30	.28
28 pin LP	.40	.37	.35
40 pin LP	.49	.46	.43

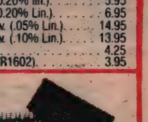


Soldertail (Gold) Standard

Part No.	1-9	10-99	100-up
8 pin SG	.39	.35	.29
14 pin SG	.49	.45	.39
16 pin SG	.55	.49	.45
18 pin SG	.65	.59	.51
20 pin SG	.75	.65	.59
22 pin SG	.79	.69	.65
24 pin SG	.79	.69	.65
28 pin SG	.95	.85	.75
36 pin SG	1.25	1.15	.99
40 pin SG	1.39	1.25	1.15

Wire Wrap Sockets (Gold) Level #3

Part No.	1-9	10-99	100-up
8 pin WW	.55	.49	.45
10 pin WW	.69	.65	.59
14 pin WW	.75	.69	.65
16 pin WW	.79	.72	.65
18 pin WW	.95	.85	.75
20 pin WW	1.19	1.09	.95
22 pin WW	1.29	1.19	1.05
24 pin WW	1.35	1.19	1.09
28 pin WW	1.69	1.55	1.39
36 pin WW	1.89	1.79	1.69
40 pin WW	2.29	1.95	1.79



Header Plugs (Gold)

Part No.	1-9	10-99	100-up
14 pin HP	.65	.59	.55
16 pin HP	.69	.65	.59
24 pin HP	1.15	.99	.89

Header Covers

Part No.	1-9	10-99	100-up
14 pin HC	.15	.13	.12
16 pin HC	.19	.17	.15
24 pin HC	.29	.25	.22

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Part No.	Pins	Function	Price
2816	24	2048x8 16K E^2PROM 350ns.	12.95

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INTERSIL

Part No.	Pins	Function	Price
FE0202D	40	4 Digit LCD Display for 7211IPL & 7211MIPL	14.95
FE0203D	40	3½ Digit LCD Display for 7106 & 7116	14.95
7045IPI	28	CMOS Precision Timer	14.95
7045EV/Kit	28	Stopwatch Chip, XTL (Evaluation Kit)	19.95
7106CPL	40	3½ Digit A/D (LCD Drive)	10.49
7106EV/Kit	40	IC, Circuit Board, Display (Evaluation Kit)	46.95
7107CPL	40	3½ Digit A/D (LED Drive)	10.95
7107EV/Kit	40	IC, Circuit Board, Display (Evaluation Kit)	46.95
7116CPL	40	3½ Digit A/D LCD Dis. HLD	10.95
7201IUS		Low Battery Volt. Indicator	2.25
7205IPG	24	CMOS LED Stopwatch/Timer	14.95
7205EV/Kit	24	Stopwatch Chip, XTL (Evaluation Kit)	16.95
7206CJPE	16	Tone Generator	4.95
7206CEV/Kit	16	Tone Generator Chip, XTL (Evaluation Kit)	7.95
7207AIPD	14	Oscillator Controller	5.95
7207AEV/Kit	14	Freq. Counter Chip, XTL (Evaluation Kit)	8.49
7211IPL	40	4 Digit LCD Display Decoder/Driver (TTL compatible)	7.95
7211MIPL	40	4 Digit LCD Display Decoder/Driver (Microproc. compat.)	8.95
7215IPG	24	4 Func. CMOS Stopwatch CKT	16.95
7215EV/Kit	24	4 Func. Stopwatch Chip, XTL (Evaluation Kit)	19.49
7216AIJI	28	8 Digit Univ. Counter C.A.	31.49
7216DIPI	28	8 Digit Freq. Counter C.C.	21.49
7217IJI	28	4 Digit LED Up/Down Counter C.A.	10.95
7217AIPI	28	4 Digit LED Up/Down Counter C.C.	9.95
7224IPL	40	LCD 4½ Digit Up Counter DRI.	10.95
7226AEV/Kit	40	5 Function Counter Chip, XTL (Evaluation Kit)	99.95

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74HC High Speed CMOS

Part No.	Pins	Price
74HC00	14	.59
74HC02	14	.59
74HC03	14	.89
74HC04	14	.59
74HCU04	14	.69
74HC08	14	.59
74HC10	14	.59
74HC11	14	.69
74HC14	14	.89
74HC20	14	.59
74HC27	14	.59
74HC30	14	.69
74HC32	14	.79
74HC42	16	1.09
74HC51	14	.89
74HC58	14	.89
74HC73	14	.79
74HC74	14	.79
74HC75	16	.99
74HC76	16	.79
74HC85	16	1.69
74HC86	14	.75
74HC107	14	.79
74HC109	16	.79
74HC112	16	.79
74HC123	16	2.29
74HC125	14	1.75
74HC132	14	1.29
74HC137	16	1.59
74HC138	16	1.19
74HC139	16	1.05
74HC147	16	1.29
74HC151	16	.99
74HC153	16	1.09
74HC154	24	2.65
74HC157	16	.99
74HC158	16	.99
74HC160	16	1.39
74HC161	16	1.39
74HC162	16	1.39
74HC163	16	1.39
74HC164	14	1.35
74HC165	16	2.15
74HC166	16	2.49
74HC173	16	1.29
74HC174	16	1.09
74HC175	16	1.09
74HC190	16	1.59
74HC191	16	1.59
74HC192	16	1.49
74HC193	16	1.49
74HC194	16	1.19
74HC195	16	1.19
74HC221	16	2.95
74HC237	16	1.49
74HC240	20	2.29
74HC241	20	2.29
74HC242	14	2.15
74HC243	14	2.15
74HC244	20	2.29
74HC245	20	2.59
74HC251	16	.99
74HC253	16	1.09
74HC257	16	.99
74HC259	16	1.69
74HC266	14	.89
74HC273	20	2.79
74HC280	14	4.59
74HC299	20	5.59
74HC366	16	2.59
74HC367	16	2.59
74HC373	20	2.69
74HC374	20	2.69
74HC390	16	1.59
74HC393	14	1.59
74HC533	20	2.69
74HC534	20	2.69
74HC595	16	3.19
74HC688	20	3.59
74HC4024	14	1.75
74HC4040	16	1.49
74HC4049	16	.89
74HC4050	16	.89
74HC4060	16	1.49
74HC4075	14	.59
74HC4078	14	.59
74HC4511	16	1.95
74HC4514	24	4.19
74HC4538	16	2.59
74HC4543	16	3.75

74HCU04 is unbuffered.

74C—C/MOS

Part No.	Pins	Price
74C00	14	.29
74C02	14	.35
74C04	14	.35
74C08	14	.35
74C10	14	.35
74C14	14	.59
74C20	14	.35
74C30	14	.35
74C32	14	.39
74C42	16	1.19
74C48	16	1.79
74C73	14	.69
74C74	14	.59
74C85	16	1.39
74C86	14	.29
74C89	16	5.95
74C90	14	1.09
74C93	14	1.09
74C95	14	1.19
74C107	14	.79
74C151	16	2.19
74C154	24	3.25
74C157	16	1.75
74C160	16	1.19
74C161	16	1.19
74C162	16	1.19
74C163	16	1.19
74C164	14	1.29
74C165	16	1.29
74C173	16	.89
74C174	16	1.19
74C175	16	1.19
74C192	16	1.39
74C193	16	1.39
74C195	16	1.29
74C221	16	1.75
74C240	20	1.95
74C244	20	1.95
74C373	20	2.29
74C374	20	2.29
74C901	14	.59
74C902	14	.79
74C903	14	.59
74C906	14	.59
74C907	14	.69
74C911	28	8.95
74C912	28	8.95
74C915	18	1.19
74C917	28	8.95
74C922	18	4.49
74C923	20	4.95
74C925	16	5.95
74C926	18	5.95
80C95	16	.69
80C97	16	.69

LINEAR

Part No.	Pins	Price
DS0026CN	8	1.95
TL071CP	8	.79
TL072CP	8	1.09
TL074CN	14	1.95
TL081CP	8	.59
TL082CP	8	1.19
TL084CN	14	1.95
LM109K		5.95
LM301CN	8	.39
LM302H		2.49
LM304H		1.95
LM305H		.99
LM307CN	8	.49
LM308CN	8	.69
LM309K		1.25
LM310CN	8	1.95
LM311CN	8	.59
LM312H		2.79
LM317T		1.19
LM317K		3.49
LM318CN	8	1.59
LM319N	14	1.49
LM320K-5		1.35
LM320K-12		1.35
LM320K-15		1.35
LM320K-24		1.35
LM320T-5		.85
LM320T-12		.85
LM320T-15		.85
LM320T-24		.85
LM322N	14	1.49
LM323K		4.95
LM324N	14	.59
LM329DZ		.65
LM331N	8	3.95
LM334Z		1.19
LM335Z		1.29
LM336Z		1.09
LM337MP		1.15
LM337T		1.89
LM338K		6.95
LM339N	14	.69
LM340K-5		1.35
LM340K-12		1.35
LM340K-15		1.35
LM340K-24		1.35
LM340T-5		.75
LM340T-12		.75
LM340T-15		.75
LM340T-24		.75
LF347N	14	1.49
LM348N	14	.89
LM350K		4.79
LF351N	8	.59
LF353N	8	.89
LF355N	8	1.09
LF356N	8	1.09
LM358N	8	.59
LM359N	14	1.79
LM370N	14	4.95
LM373N	14	4.95
LM377N	14	1.95
LM380CN	8	1.09
LM380N	14	.89
LM381N	14	1.79
LM382N	14	1.49
LM384N	14	1.95
LM386N-3	8	.89
LM387N	8	1.39
LM389N	18	1.19
LM391N-80	16	1.19
LM392N	8	.59
LM393N	8	.45
LF398N	8	3.95
LM399H		5.95
LF412CN	8	1.95
TL494CN	16	2.79
TL496CP	8	1.59
NE531V	8	1.79
NE540H (C540H)		2.95
NE544N	14	1.95
NE550A	14	1.95
NE555V	8	.35
XR-L555	8	.69
LM556N	14	.79
NE558N	16	1.59
NE564N	16	1.95
LM565N	14	.99
LM566CN	8	1.49
LM567V	8	.99
NE570N	16	2.95
NE571N	16	2.49
NE592N	14	1.19
LM703CN	8	1.49
LM710N	14	.69
LM711N	14	.79
LM723N	14	.49
LM733N	14	.89
LM739N	14	1.95
LM741CN	8	.39
LM747N	14	.69
LM748N	8	.59
UA760HC		9.95
LM1456V	8	1.95
LM1458CN	8	.59
LM1488N	14	.69
LM1489N	14	.69
LM1496N	14	.99
LM1605CK		9.95
LM1871N	18	2.95
LM1872N	18	3.25
LM1877N-9	14	2.95
LM1889N	18	1.95
LM1896N	14	1.59
LM2002T		1.95
ULN2003A	16	1.49
XR2206	16	3.95
XR2207	14	2.49
XR2208	16	1.79
XR2211	14	2.95
LM2877P		1.95
LM2878P		2.95
LM2901N	14	.79
LM2902N	14	.69
LM2907N	14	2.49
LM2917N	8	1.95
LM3900N	14	.59
LM3905CN	8	1.19
LM3909N	8	.89
LM3914N	18	2.39
LM3915N	18	2.39
LM3916N	18	2.39
RC4136N	14	1.25
RC4151NB	8	1.95
RC4193NB	8	1.95
RC4195TK		5.95
LM4250CN	8	1.49
NE5532	8	1.69
NE5534	8	1.39
78L05A		.39
78L12A		.39
79L05A		.59
79M05AH		1.29
ICL8038	14	3.95
LM13080N	8	1.19
LM13600N	16	1.19
75477	8	.99
76002	14	1.95
76477	28	3.95

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• Plugs into User Port • Provides Standard RS232 signal levels • Uses 6 signals (Transmit, Receive, Clear to Send, Request to Send, Data Terminal Ready, Data Set Ready).

JE232CM $39.95

VOICE SYNTHESIZER FOR COMMODORE VIC-20 AND C-64

Plug-In — Talking in Minutes!

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TRS-16K3 200ns (Model III). $6.99
TRS-16K4 250ns (Model 1). $5.49

TRS-80 COLOR AND COLOR II

Easy to install Kit comes complete with 8 each 4164N-20 (200ns) 64K Dynamic RAMs and documentation for conversion. Converts TRS-80 Color Computers with D, E, ET, F and NC circuit boards to 32K. Also converts TRS-80 Color Computer II to 64K. Flex DOS or OS-9 required to utilize full 64K RAM on all computers.

TRS-64K-2. . . . . $17.95

TRS-80 MODEL IV & 4P

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TRS-64K-2. . . . . $17.95
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TRS-64K2PAL (Model IV only). $38.95
(8 - 4164's with PAL Chip to expand from 64K to 128K)

• TRS-80 Model 100* • NEC • Olivetti

*ALSO COMPATIBLE WITH NEC PC-8201A AND OLIVETTI M10

Easy to install module plugs right into the socket increasing memory in 8K increments. Complete with module and documentation for conversion.

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Please specify Operating System
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PC200 (200 Watt Rating). $299.95
XT300 (300 Watt Rating). $399.95
AT500 (500 Watt Rating). $699.95
AT800 (800 Watt Rating). $799.95

★★★★★ APPLE Accessories ★★★★★

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16K RAM Card (Language Card)

The ARC-16K RAM Card allows the Apple* II and II+ computers to expand from 48K to 64K. Complete with instructions. Key: (a)

ARC-16K. $39.95

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The AZ80-1 is Soft-card compatible. Used with CP/M related programs. Software not included. Key: (a,b)

AZ80-1. . . . . $49.95

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The A80-C is an 80-column card designed for the Apple* II and II+ computers. The card is equipped with a soft switch which allows easy hookup for any monitor. The A80-C also features inverse video capabilities. This card is similar to the Videx*** 80 column card. Complete with instructions. Key: (a)

A80-C. $74.95

Super Serial Card

The ASSC-P is a serial card with a printer mode. It generates standard RS-232C signals and is similar to the Apple* Super Serial Card. Complete with instructions. Key: (a,b)

ASSC-P. $99.95

Parallel Card w/64K Buffer

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APC-64K. $129.95

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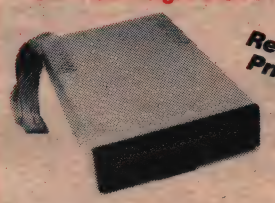

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ADD-12. . . . . $159.95

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• Uses Shugart SA390 mechanics • 143K formatted storage • Color matches Apple Computer • Works with Apple Controller or other Apple-compatible controllers (ACC-1) • Complete with connector – just plug into your disk controller card • 35 tracks • Size: 6"W x 3½"H x 8-9/16"D • Wt.: 4¼ lbs. Key: (a,b)

ADD-514 (Disk Drive). $149.95
ACC-1 (Controller Card). . . . . $ 49.95

APPLE™ *IIc* Compatible 5¼" Half-Height Disk Drive

• Same specs as ADD-12 (left) except no controller necessary

ADD-IIc. $169.95

Additional Apple* Compatible Products

APF-1	Cooling Fan with surge protection • Key: (a,b).	$ 39.95
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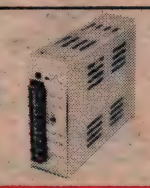

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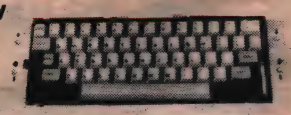

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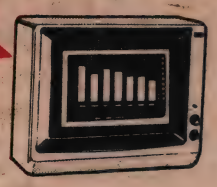

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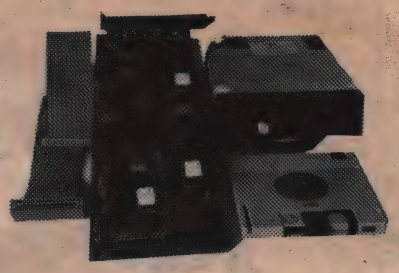

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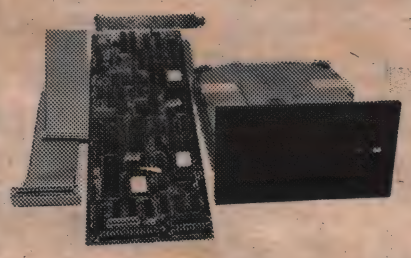

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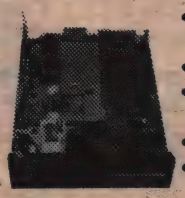

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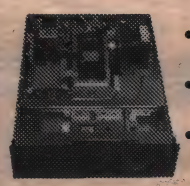

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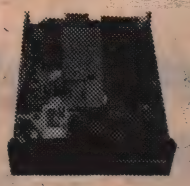

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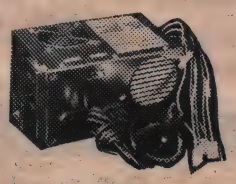

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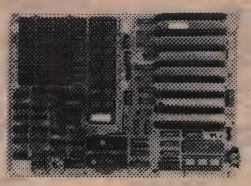

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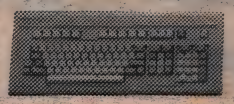

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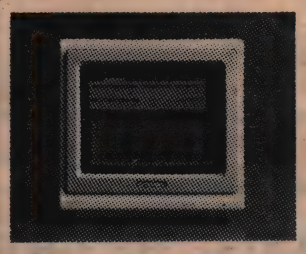

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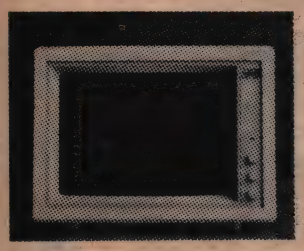

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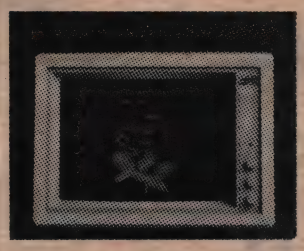

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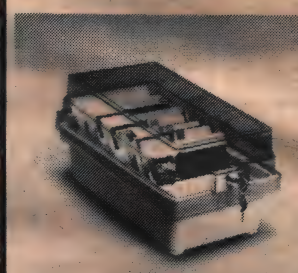

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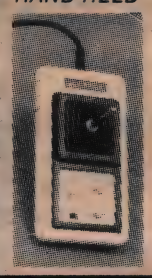

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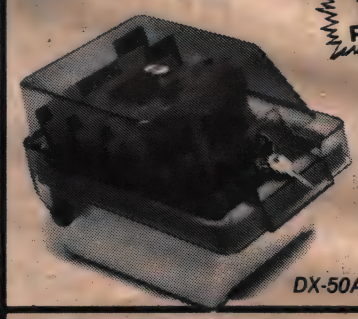

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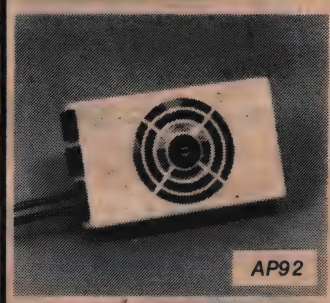

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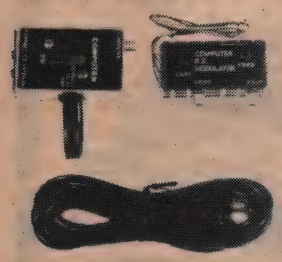

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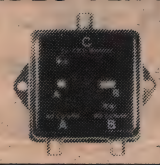

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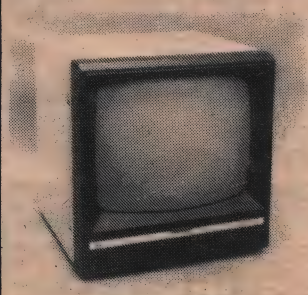

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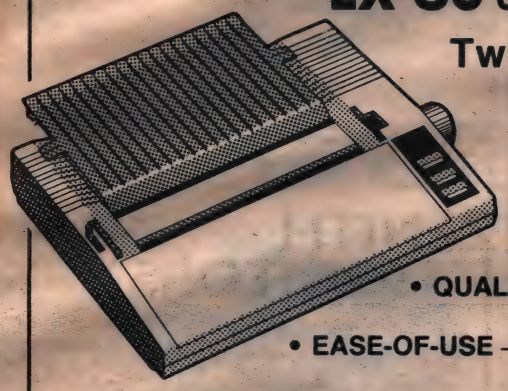

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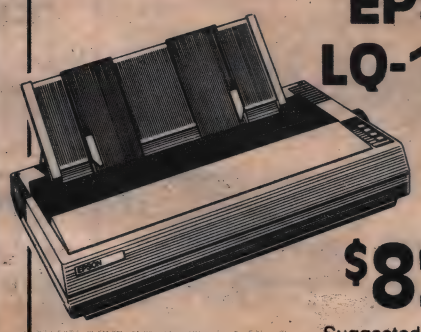

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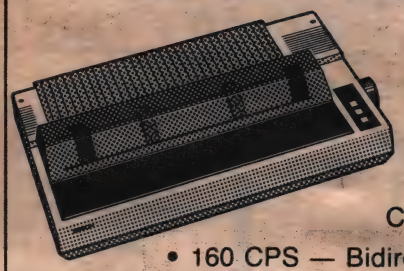

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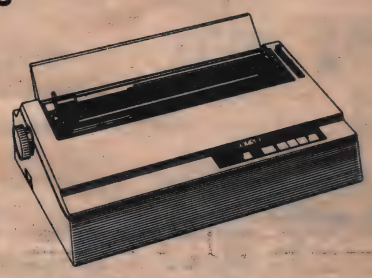

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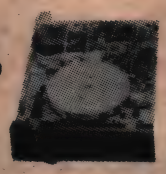

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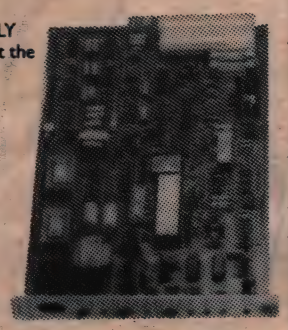

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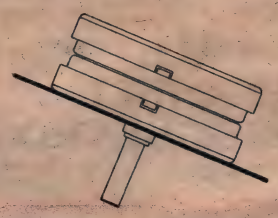

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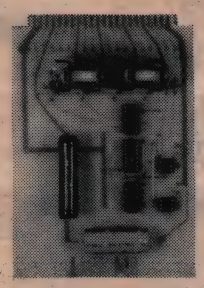

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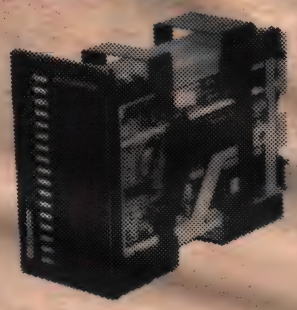

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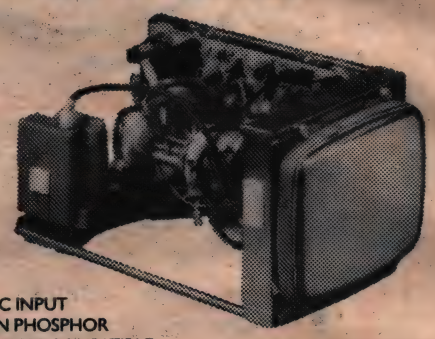

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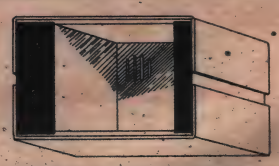

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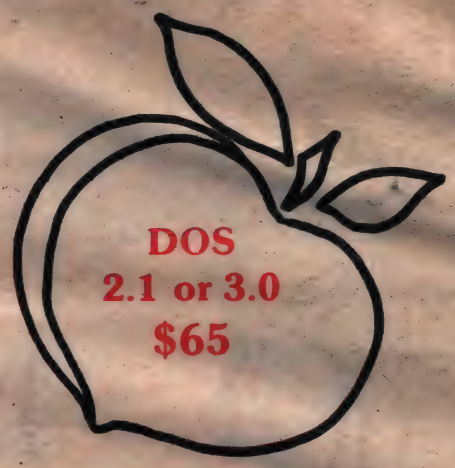

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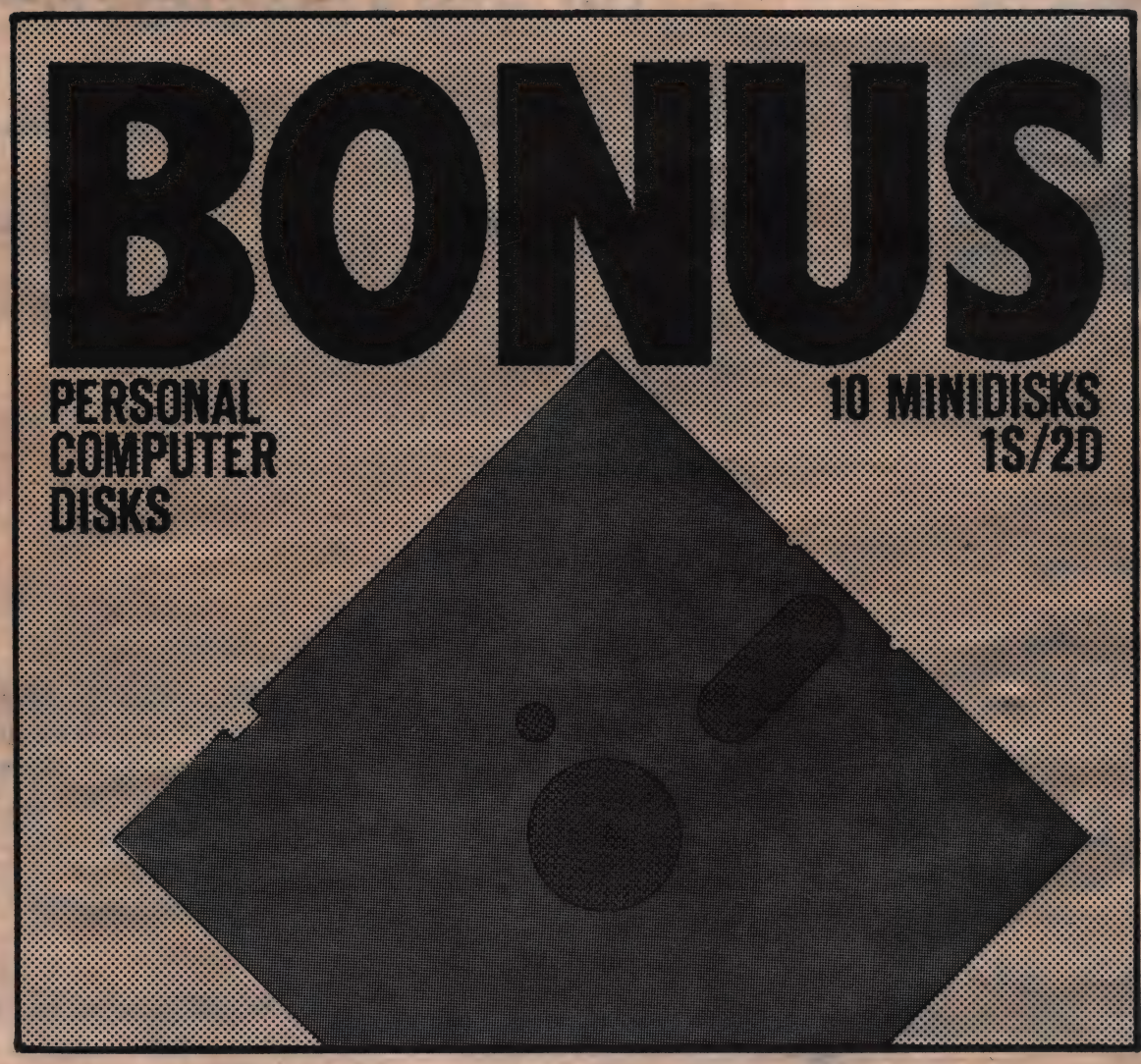

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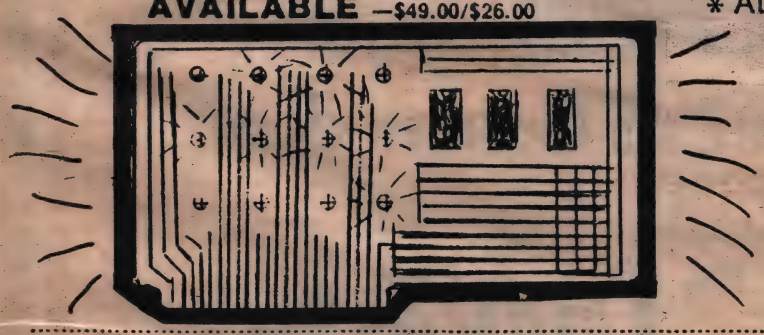

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LS03	.20	LS166	.99
LS04	.20	LS169	1.25
LS05	.20	LS174	.45
LS08	.20	LS175	.40
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LS10	.20	LS191	.90
LS11	.20	LS192	.80
LS12	.35	LS193	.80
LS13	.40	LS194	.65
LS14	.40	LS195	.60
LS15	.32	LS196	.70
LS20	.20	LS197	.85
LS21	.25	LS221	.65
LS27	.28	LS240	1.00
LS30	.20	LS241	.80
LS32	.25	LS242	1.00
LS33	.40	LS243	1.00
LS37	.33	LS244	1.00
LS38	.30	LS245	1.00
LS42	.40	LS251	.50
LS51	.24	LS253	.50
LS54	.25	LS257	.50
LS55	.24	LS258	.55
LS73	.35	LS259	2.00
LS74	.30	LS260	.50
LS85	.60	LS266	.40
LS86	.25	LS273	1.00
LS90	.50	LS279	.40
LS93	.55	LS280	1.00
LS107	.37	LS283	.50
LS109	.25	LS290	.85
LS112	.30	LS293	.85
LS122	.45	LS298	.75
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LS126	.49	LS364	1.10
LS132	.50	LS366	.45
LS133	.35	LS367	.50
LS138	.45	LS368	.40
LS139	.40	LS373	1.00
LS151	.45	LS374	1.00
LS153	.40	LS375	.50
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LS155	.50	LS378	.85
LS156	.50	LS390	1.00
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LS160	.65	LS670	1.50
LS161	.50	25LS2569	3.00
LS162	.65		

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7400	.22	7473	.34	74162	.60
7402	.22	7474	.40	74163	.60
7405	.22	7483	.45	74164	.80
7406	.33	7485	.55	74165	.80
7407	.33	7486	.30	74166	1.00
7408	.24	7490	.35	74173	.75
7410	.19	7493	.33	74174	.85
7413	.33	7496	.40	74175	.80
7420	.22	74107	.28	74181	1.50
7425	.25	74109	.45	74185	1.70
7427	.25	74121	.27	74192	.70
7428	.25	74123	.40	74193	.80
7430	.20	74125	.49	74195	.80
7432	.27	74132	.40	74199	1.00
7433	.25	74148	1.00	74221	1.00
7440	.19	74151	.50	74273	1.75
7442	.40	74153	.50	74365	.60
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7453	.22	74157	.50	74367	.60
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7472	.25	74161	.60		

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3.4560	1.49
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3.6864	1.10
4.000	1.75
4.194304	1.50
4.433618	.75
4444.000	1.25
4.9152	2.49
4.916 Bd. Rate	1.25
5.000000	1.50
5.0688	2.50
5.616	1.59
6.000	2.49
6.176	1.49
7.164112	1.00
7.3728	1.49
8.000	1.49
9.000	1.49
9.90000	1.25
10.69425	2.50
10.8864	1.49
10.920	1.49
11.088	1.59
12.000	2.75
13.440	1.00
14.31818	1.00
15.2	1.10
16.00000	1.50
16.5888	1.49
17.430	2.49
18.000	1.49
18.2259	1.00
18.4320	1.49
20.000	1.50
21.87108	1.00
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32.000	2.49
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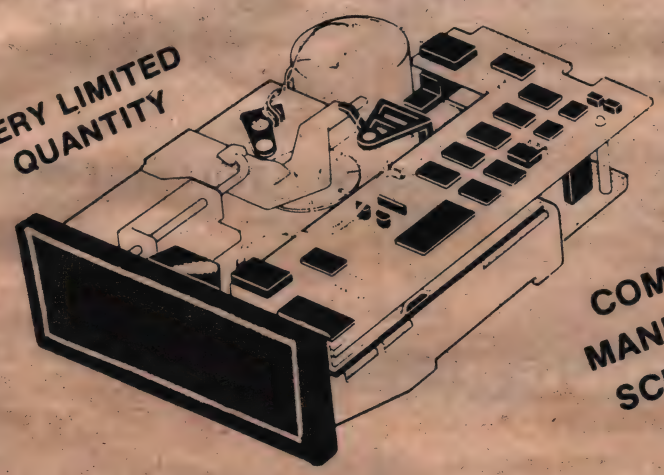

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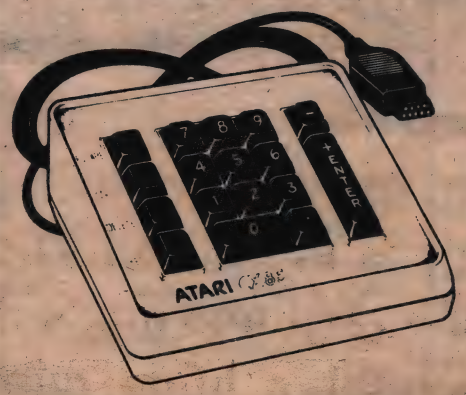

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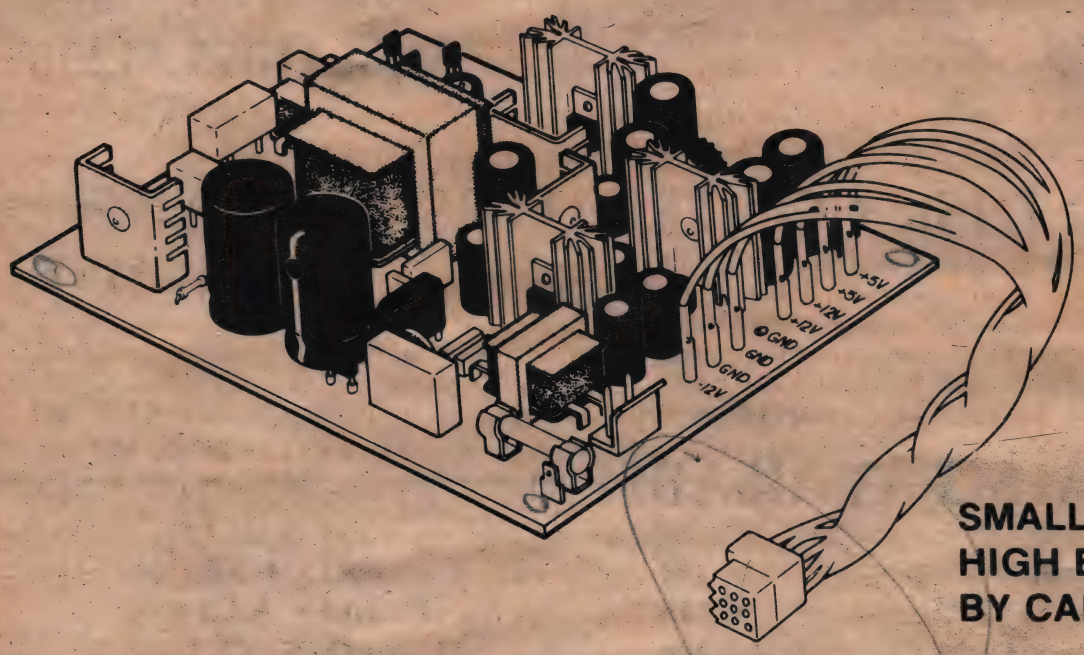

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+ 5VDC 5 AMPS MAX
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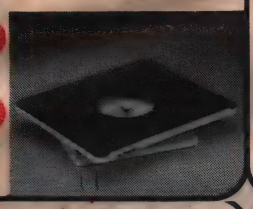

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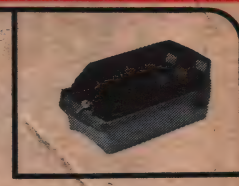

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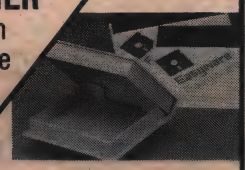

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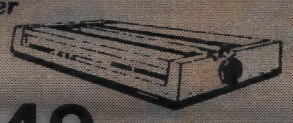

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Make you move to the most advanced wide column printing today with the Okidata 93

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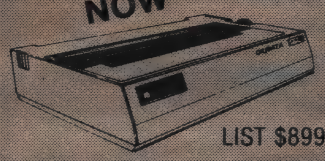

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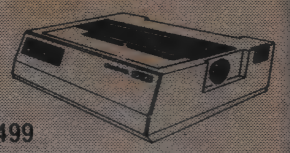

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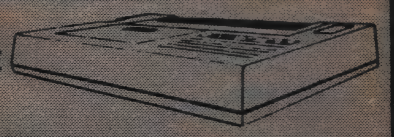

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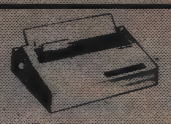

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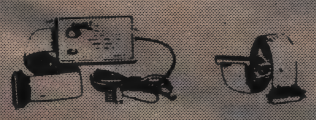

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* **Access to an Extensive IBM Compatible Software Library -** Productivity of any computer system depends to a significant degree on the software chosen. The Z-150 PC allows selection from the full range of 16-bit software developed for the IBM Personal Computer.

* **Extensive Memory and Storage Capacity -** You get 320k RAM and dual disk drives. The IBM standard format double sided / double density 5¼" floppy disks store 360k each. The optional hard disk drive provides an extensive 10.6 Mb of added storage. The Z-150 PC provides the capacity to handle the larger, more comprehensive business programs.

* **More Expansion Slots to Meet Growing Needs -** Four open IBM compatible slots are standard for Z-150 PC expansion. Access a wider variety of software programs and peripherals to meet the ever-changing needs of business.

* **Graphics in Full Color or Choice of Monochomatic Displays -** Choose either an amber or green phosphor monochrome monitor. Or opt for RGB and composite video display and enjoy the benefits of full color, interest-grabbing business graphics presentations.

* **User-Friendly, Detached Keyboard -** A detached keyboard with clearly labeled and color-coded keypads and a calculator-style numeric keypad allows quick access to the right key. Ten programmable function keys, separate plus and minus keys, and an L-shaped return key increase the Z-150's ease of accurate data entry. LED indicators on the keyboard give instant operating status notice.

* **Standard Parallel Printer Port -** Expand your Z-150 PC by utilizing the parallel port to add a matrix or letter quality printer or other beneficial peripheral.

* **Three Levels of Diagnostics -** Protect your data entries by checking the Z-150's PC's hardware system accuracy through three separate testing procedures: Automatic power-on diagnostics with LED indicators; ROM-based user-invoked LED display; and optional, extensive disk-based diagnostics.

* **Important Extras Standard -** Compliments of the Z-150 PC, users can enjoy such added features as smooth scroll search, booting from either drive, a superior configuration program, high density diskette formatting, four display type styles to choose from and much more.

* **Designed for Strength and Easy On-Site Maintenance -** Modular design is the basis for optimally easy maintenance. Components plug into place in minutes reducing repair time to a minimum in the unlikely event service is ever needed.

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"THE QUALITY GOES IN BEFORE THE NAME GOES ON!"

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6. Electronic Filing / Data Management Software to speed storage and retrieval of your customer or supplier information etc. (newBase)
7. MS-DOS Operating System to give you access to the largest possible base of applications software.
8. 6 Outlet Power Management Strip with lighted on-off switch to protect your valuable investment.
9. Box of 10 DS/DD 5¼" Diskettes and an attractive smoked plexiglass diskette box.

How does the Zenith Z-150 compare to the IBM PC?	Zenith Z-150 PC	IBM PC
Runs MS-DOS and PC-DOS Software	Yes	Yes
Standard Color Graphics Adapter	Yes	No
Parallel Printer Port Standard	Yes	No
Memory on Processor Board	320K	256K
Slow Scroll Feature	Yes	No
Boots from Either Drive	Yes	No
Business Software and DOS Standard	Yes	No
Easy Access to National Service	Yes	Yes
Diagnostics in ROM	Yes	No
Power Supply	165 W	65W
LED on Caps and Numeric Lock and Large Shift Key	Yes	No

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3. MS-DOS Operating System
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5. Electronic Spreadsheet (Multiplan)
6. Electronic Filing / Data Management (newBase)
7. 6 Outlet Surge Strip
8. Box of 10 Brand Name 5¼" Diskettes

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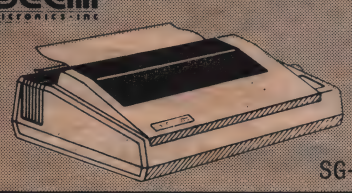

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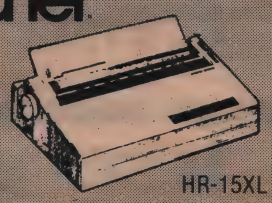

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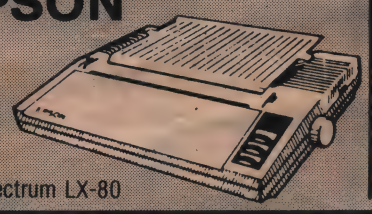

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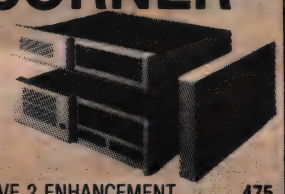

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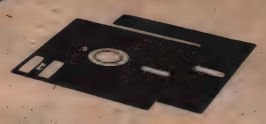

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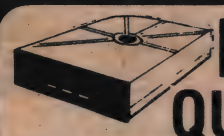

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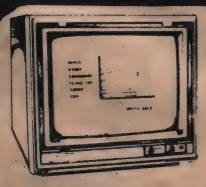

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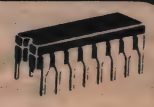

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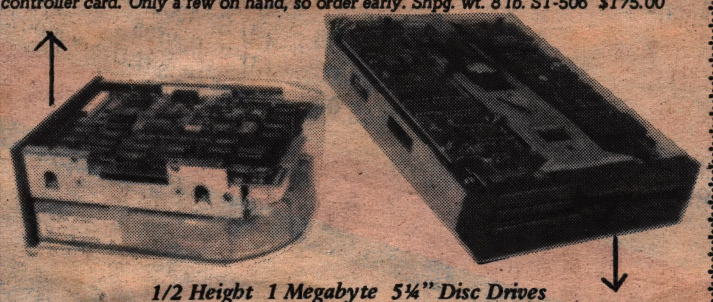

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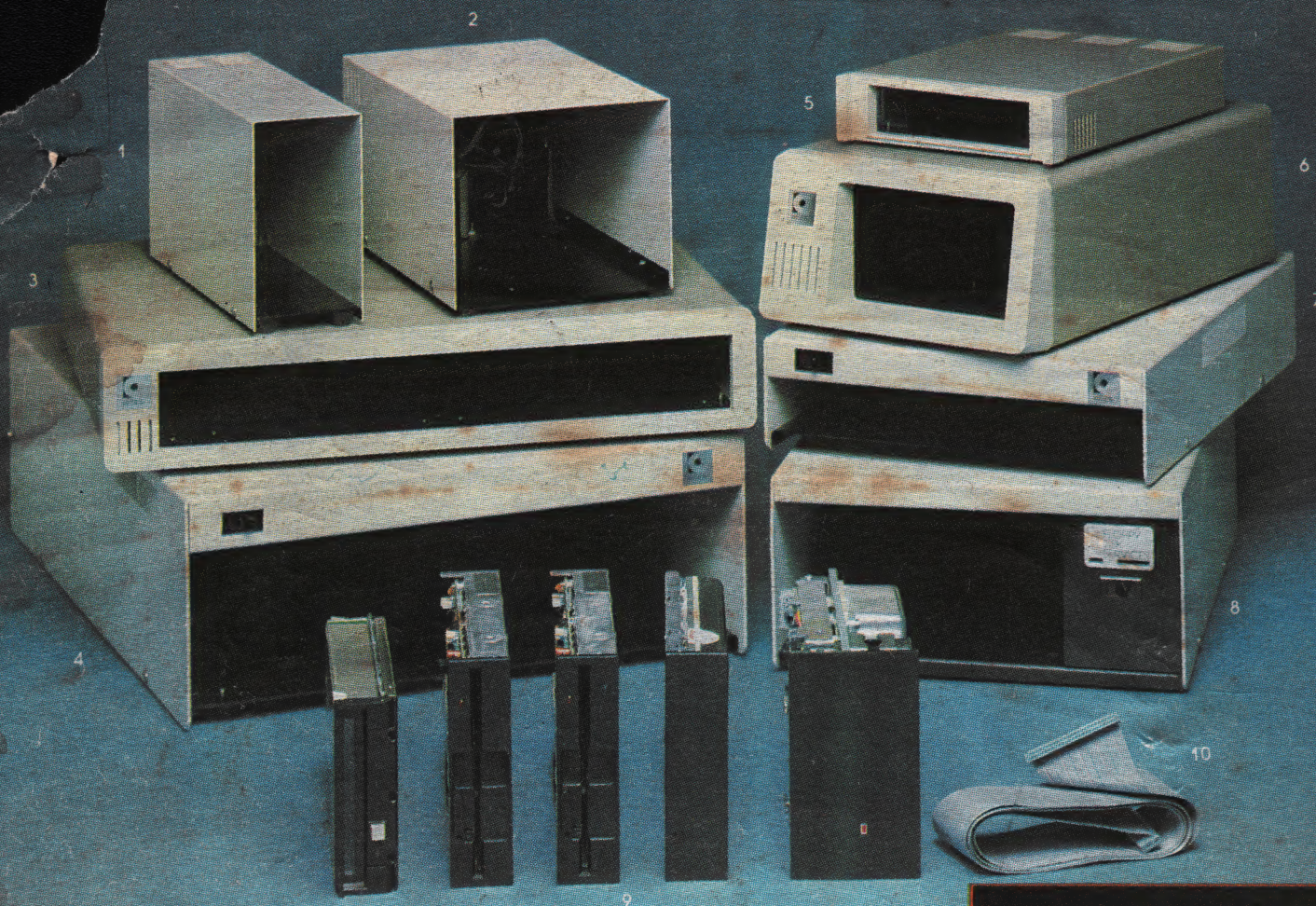

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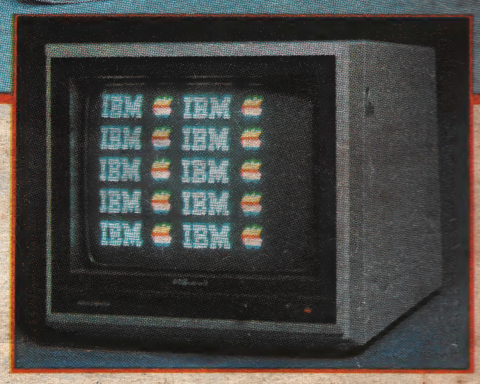

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